

USFS National Flow Gage

Gap Analysis - Region 8



White Springs, Florida, USGS



Prepared by

Dona Horan, Dan Isaak, Charlie Luce, RMRS

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Commissioned by

Chris Carlson, Katherine Smith, WO

Introduction

The purpose of this study is to review the location of stream gages across the region that are located on, or near, US Forest Service land, and to determine where there are gaps in the distribution of gages across the region.

Questions answered by this analysis include:

- What proportion of the lands in Region 8 are NFS lands?
- What is the extent of the stream network in the region?
- Where are the operational stream gages?
- Where have gages been discontinued?

Data presented in these slides were obtained from the following:

- **Streams:** stream layers (1:100K) were downloaded from the NHDPlus website:
<http://www.horizon-systems.com/nhdplus/data.php>
- **Gages:** 4,868 stream gage locations were downloaded from the USGS website:
<http://waterservices.usgs.gov/rest/Site-Test-Tool.html>

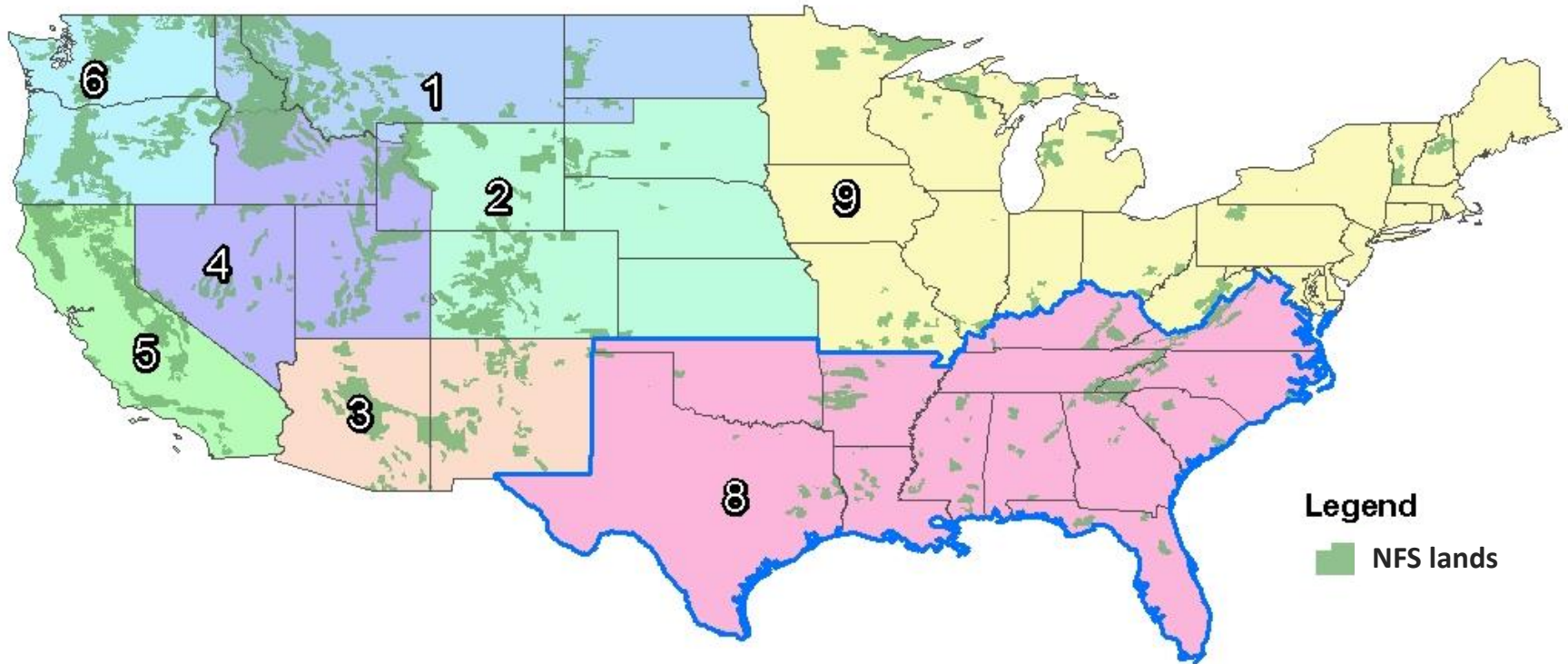
A note about the gage data:


Gage data were downloaded in spring 2012. We assumed that gages having no data beyond 12/31/09 were inactive and were labeled “Historic” in this analysis. Gages that had data past 1/1/10 were considered “Current” in the event their data had not yet been added to the website.

Summary Data

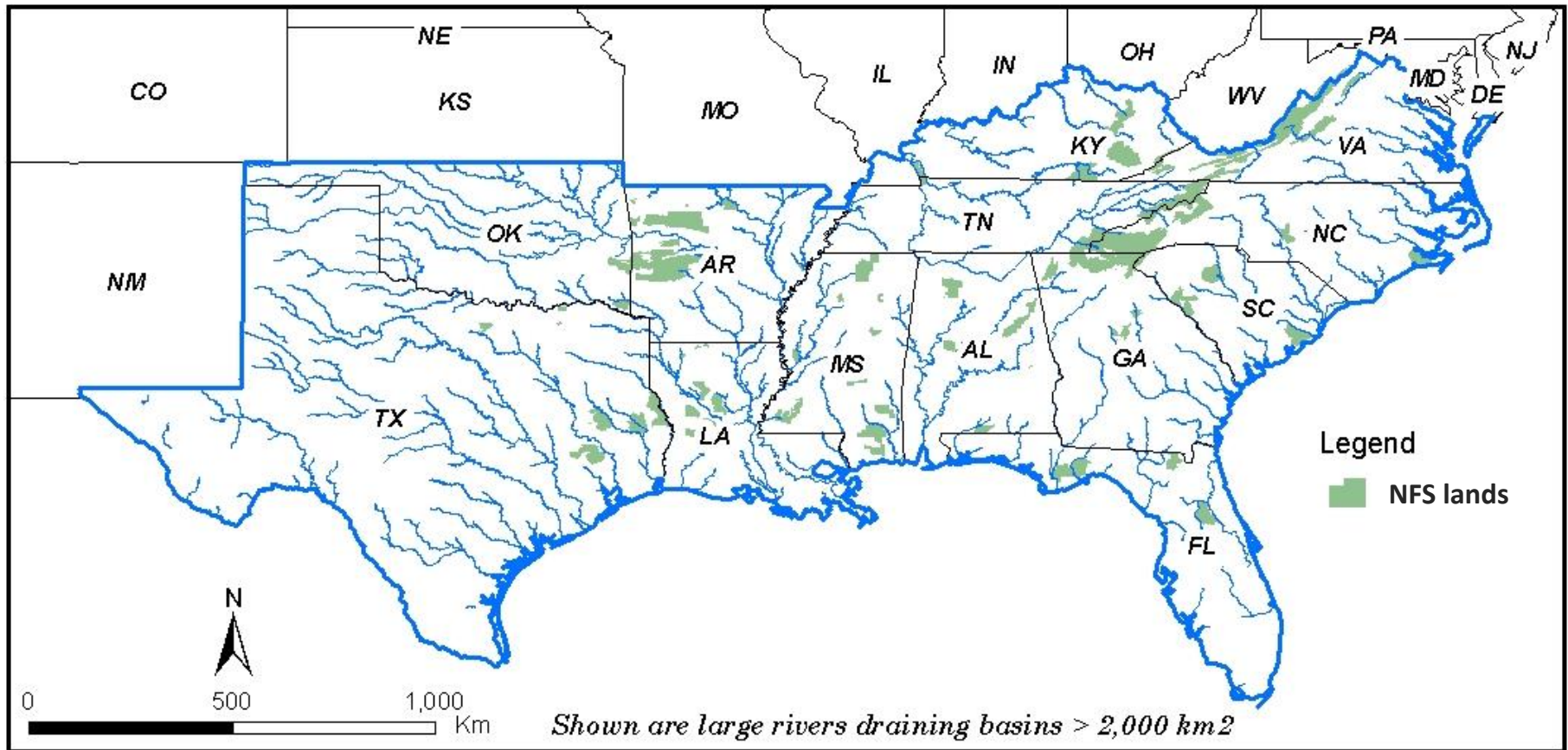
Attribute	On NFS lands in Region 8	All of Region 8	% NFS vs. Region 8
Land Area (Km ²)	122,500	2,585,750	4.7
Stream Length (km) (for basins >4 km ²)	43,700	945,120	4.6
Number of Historic Gages	144	2,632	5.5
Number of Current Gages	100	2,236	4.5


USFS Regions in Lower 48



	NFS lands in R8 	All lands in R8	% NFS land in R8
Area (Km ²)	122,500	2,585,750	4.7

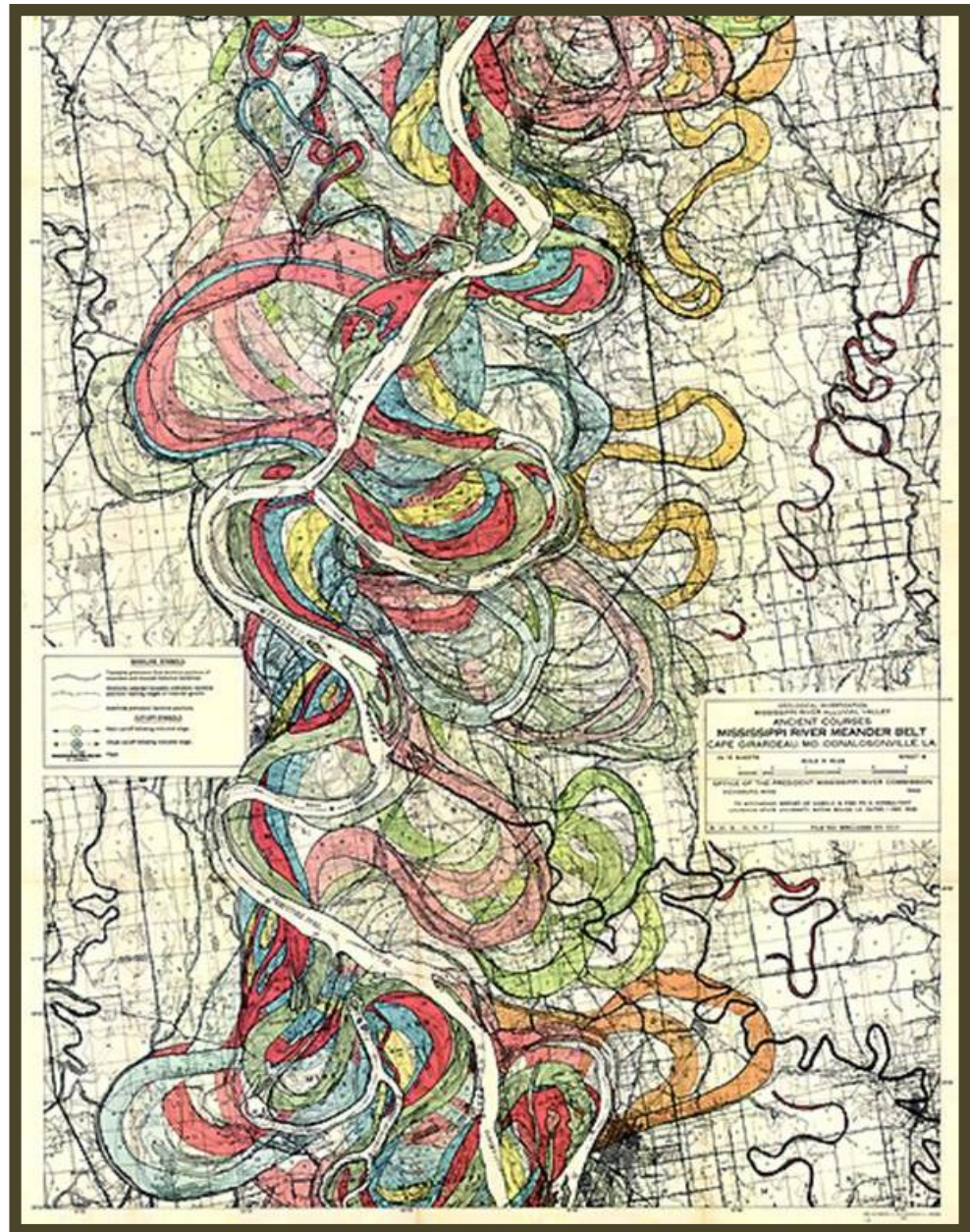
Stream Network in Region 8



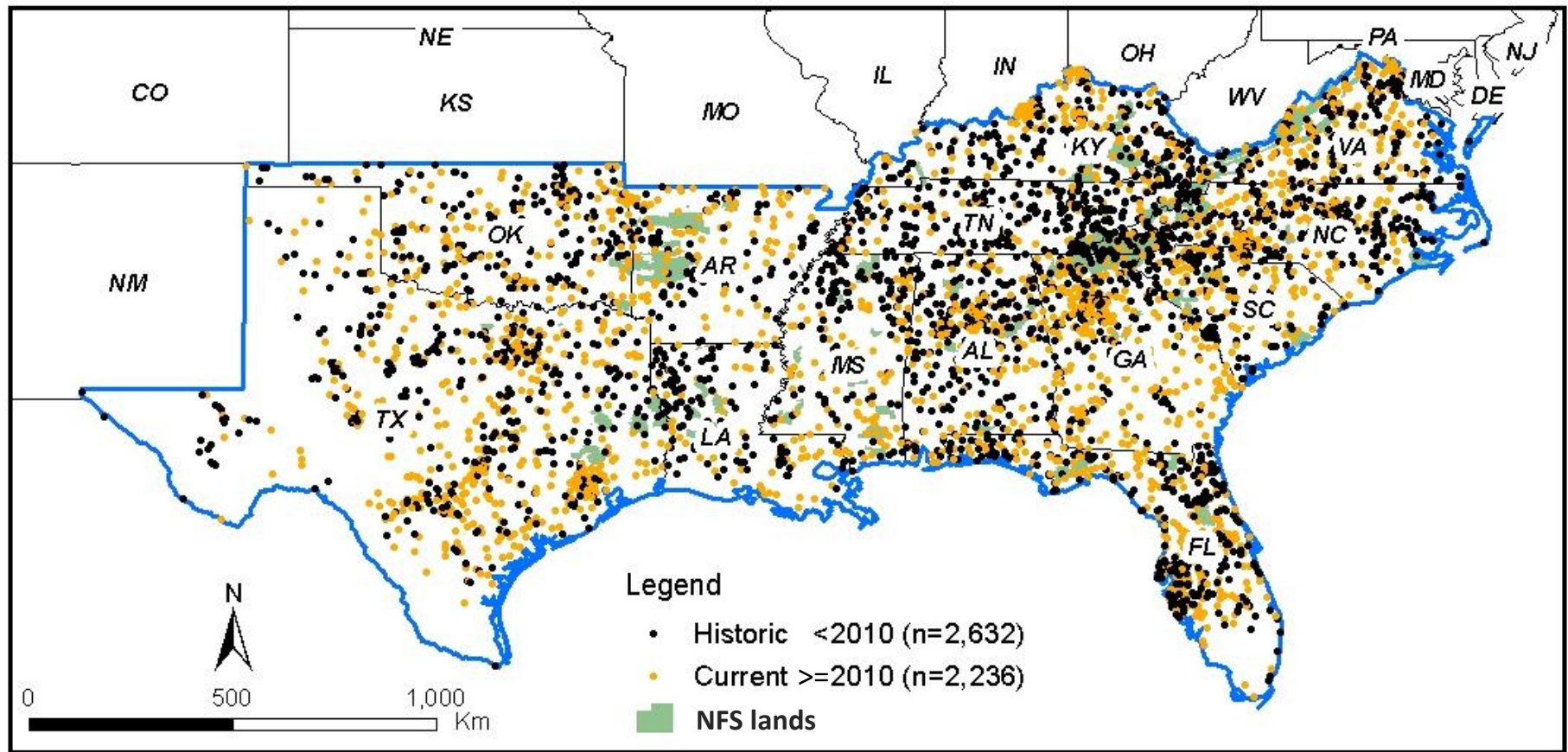
	NFS streams in R8 	All streams in R8	% NFS streams in R8
Stream Length (km) (for basins >4 km ²)	43,700	945,120	4.6

The following slides show
the location of
USGS gages
having discharge data
collected from
1912 - 2012

*Map of ancient courses
of the Mississippi River
Cape Girardeau, MO -
Donaldsonville, LA.
from Fisk, 1944.*

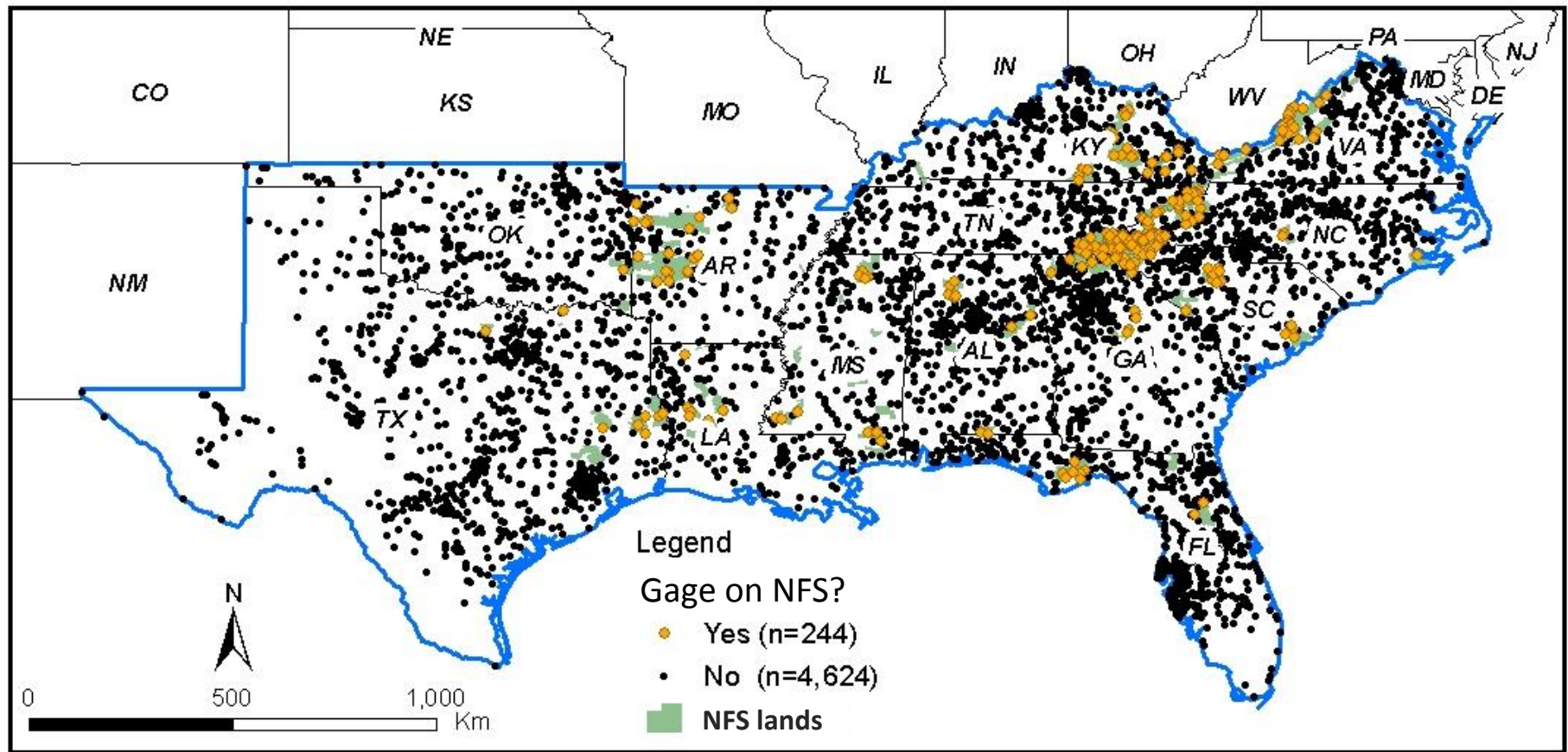


Historic and Current USGS Stream Gages from 1912 - 2012 (n=4,868)



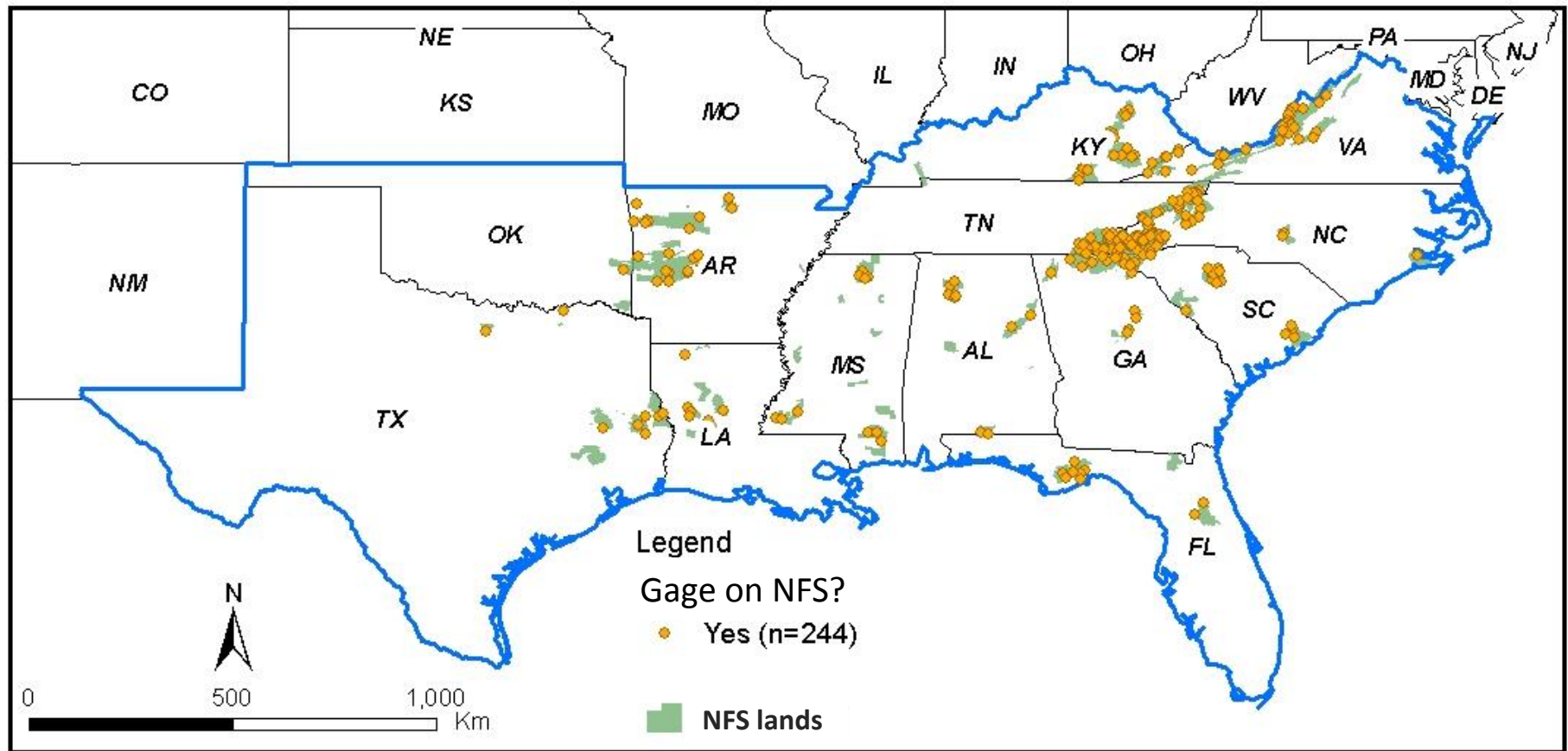
	Gages on NFS lands in R8	All gages in R8	% Gages on NFS lands in R8
Historic Gages	144	2,632	5.5
Current Gages	100	2,236	4.5

USGS Stream Gages from 1912 - 2012: Identifying those off and on NFS Lands



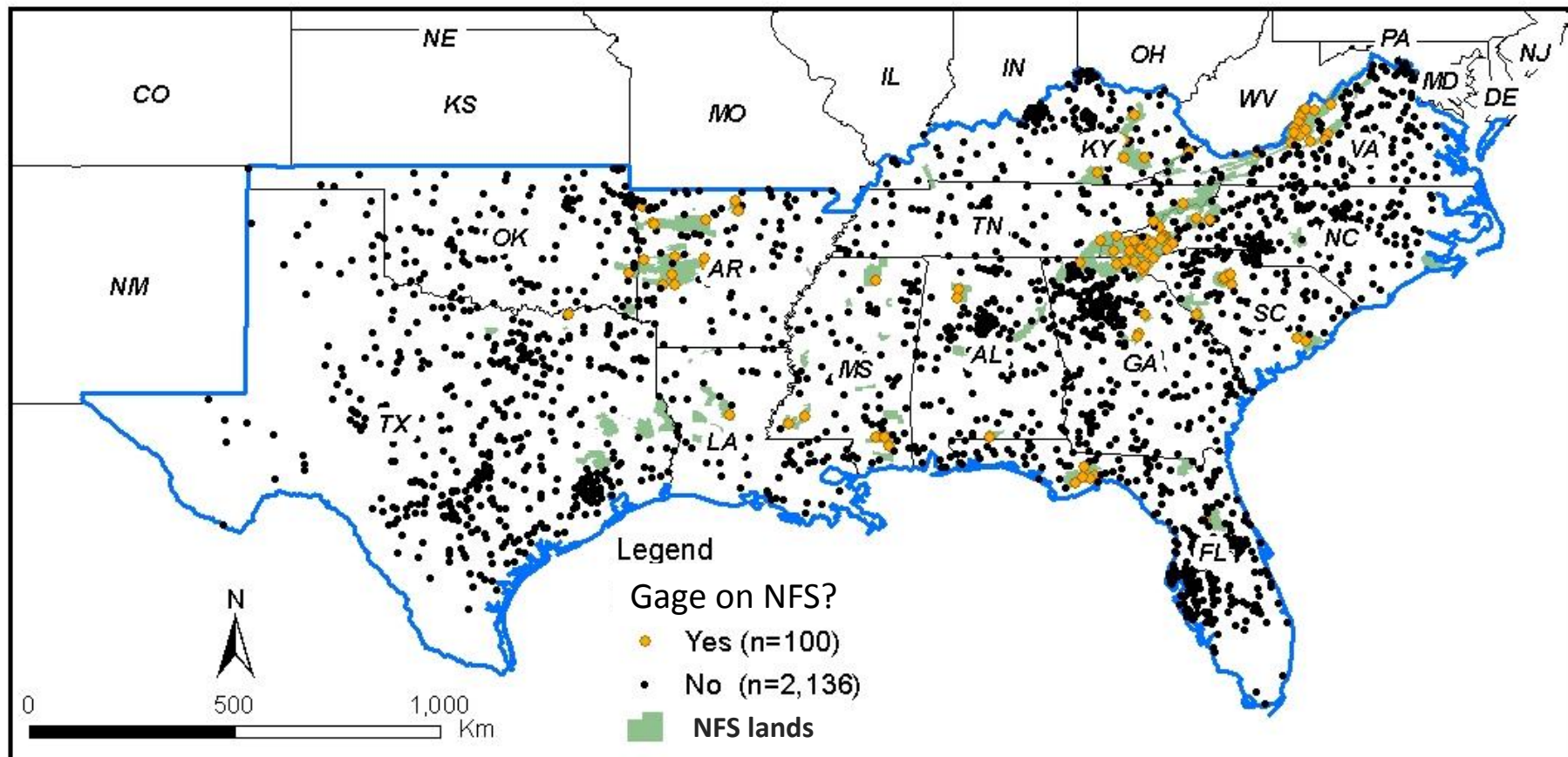
	Gages on NFS lands in R8	All gages in R8	% Gages on NFS lands in R8
Gages	244	4,868	5.0

USGS Stream Gages from 1912 - 2012: Only those on NFS Lands



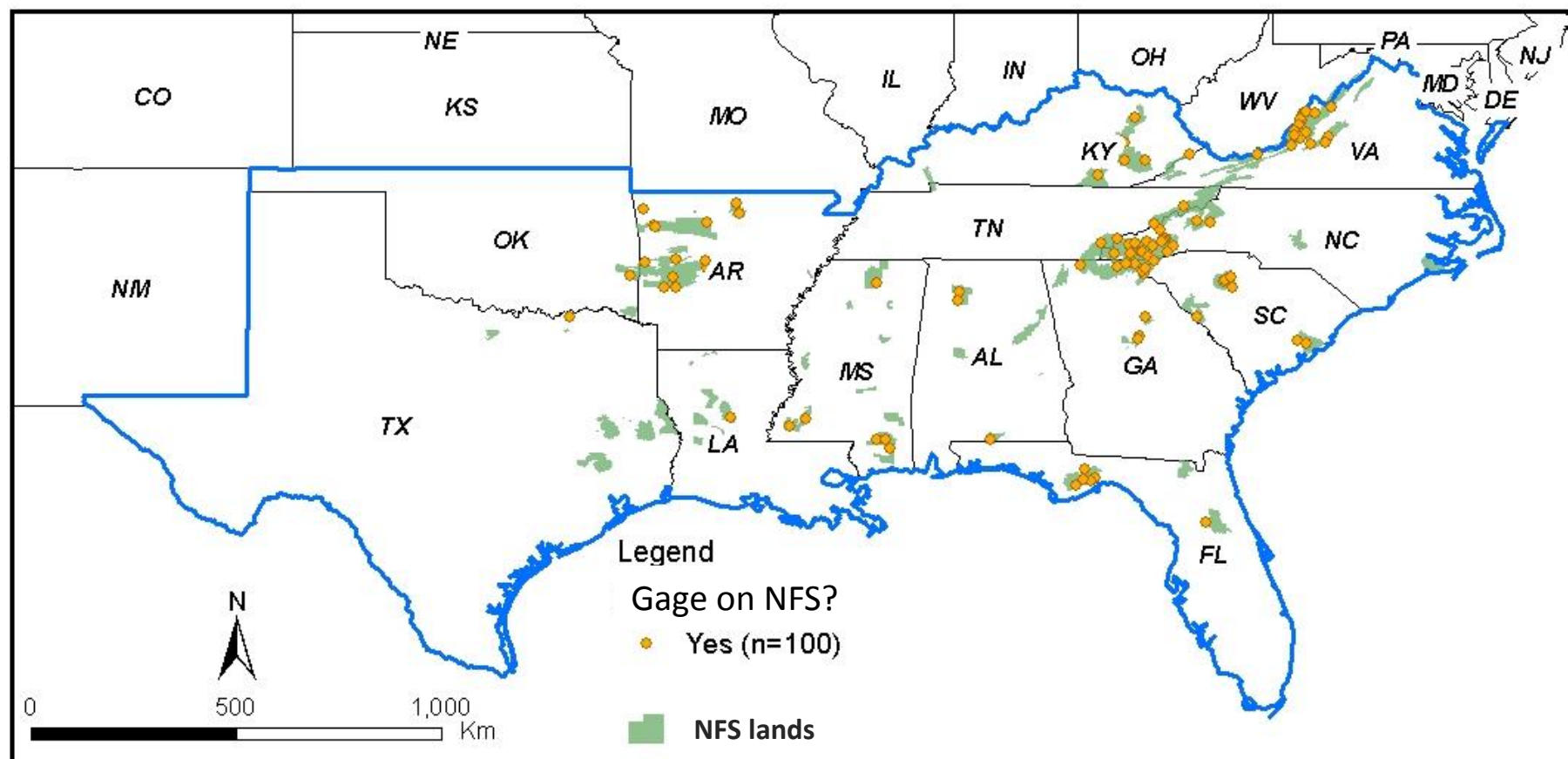
	Gages on NFS lands in R8	All gages in R8	% Gages on NFS lands in R8
Gages	244	4,868	5.0

USGS Stream Gages Currently Operational: Identifying those off and on NFS Lands



	Gages on NFS lands in R8	All gages in R8	% Gages on NFS lands in R8
Current Gages	100	2,236	4.5

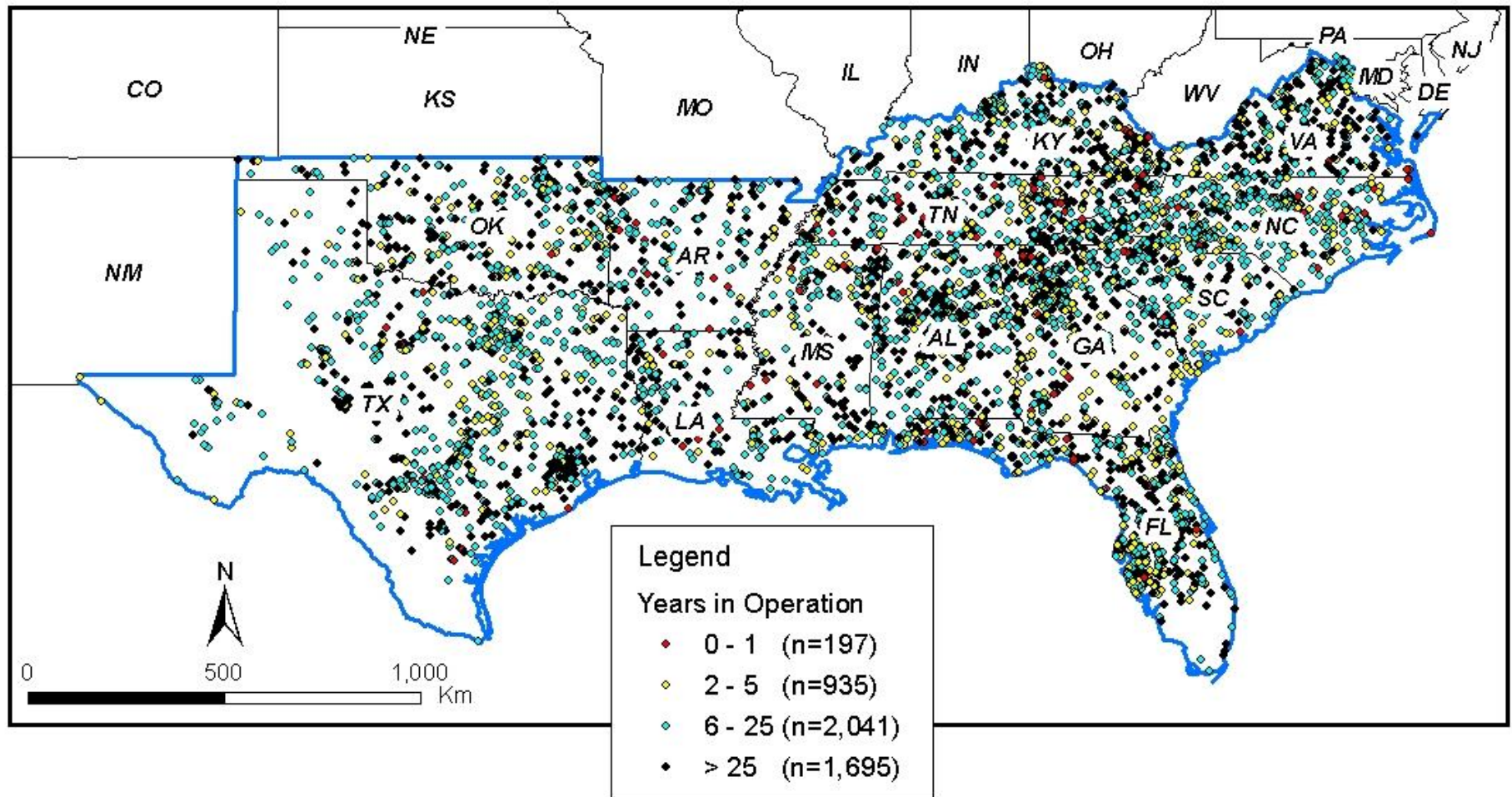
USGS Stream Gages Currently Operational: Only those on NFS Lands



	Gages on NFS lands in R8	All gages in R8	% Gages on NFS lands in R8
Current Gages	100	2,236	4.5

Years in Operation

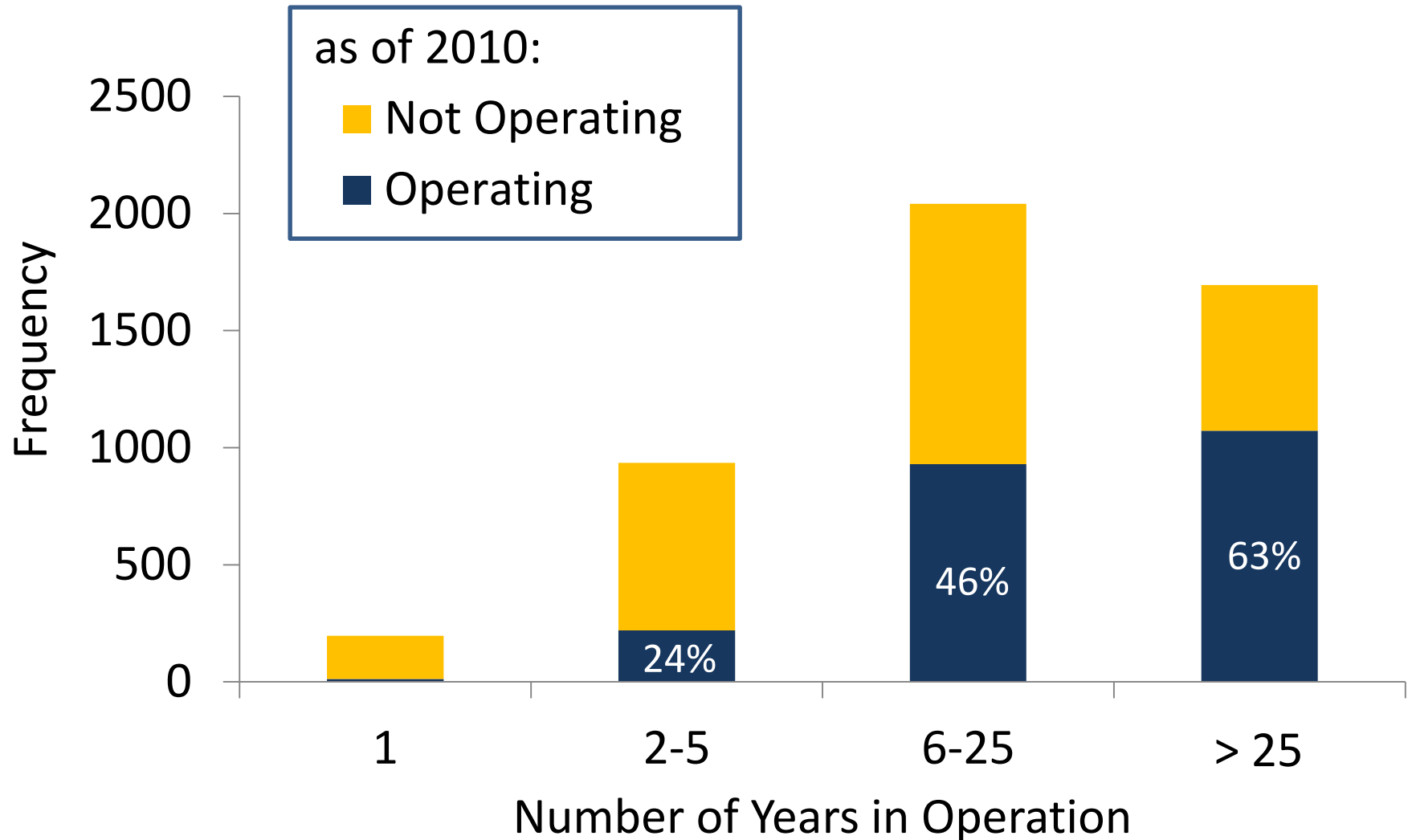
USGS Stream Gages from 1912 - 2012 (n=4,868)



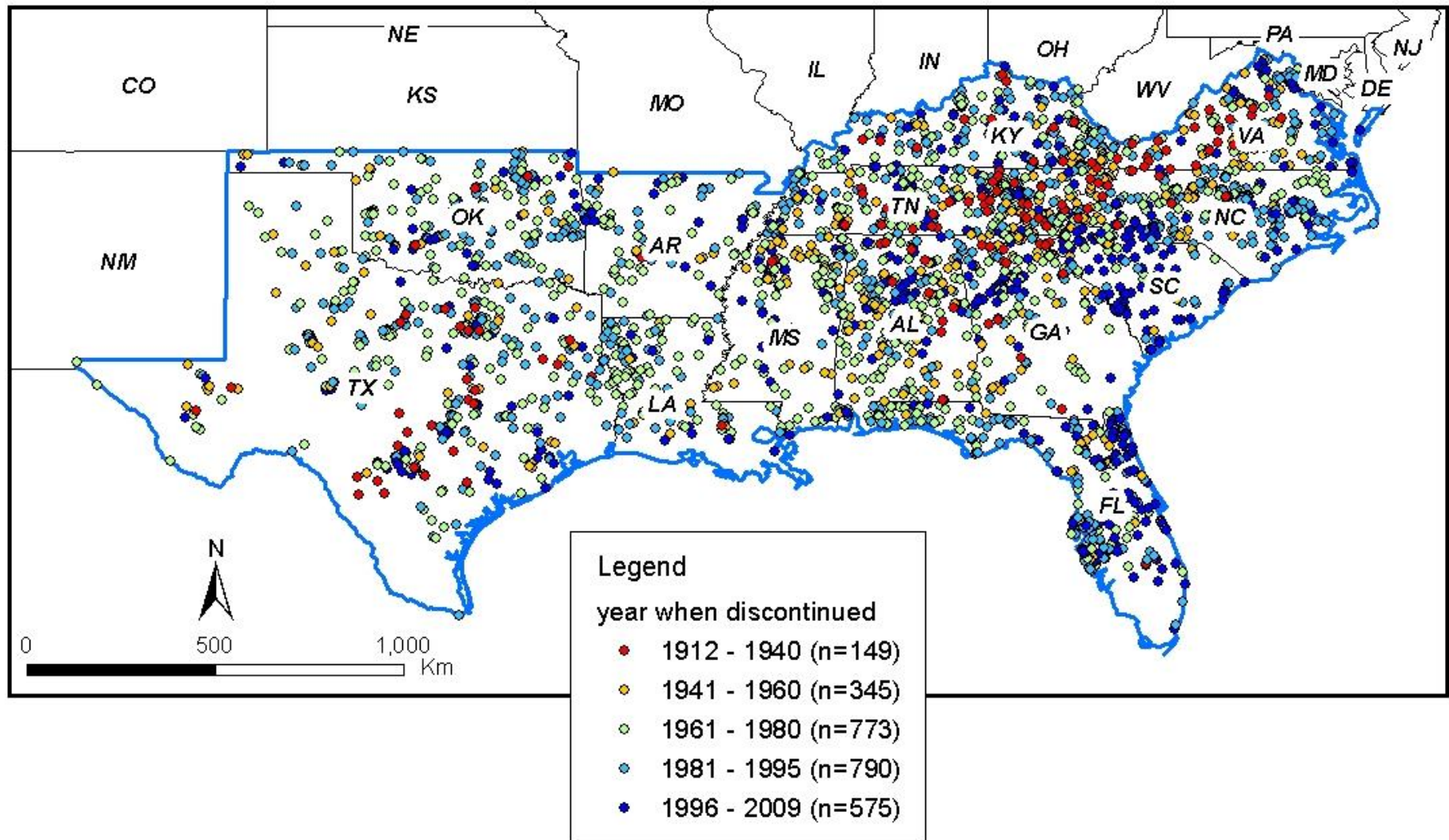
The next slide displays
these data in a bar chart.

Years in Operation

USGS Stream Gages from 1912 - 2012 (n=4,868)



Year when Discontinued USGS Stream Gages from 1912 - 2009 (n=2,632)



Group 1

Stream Segments in Region 8

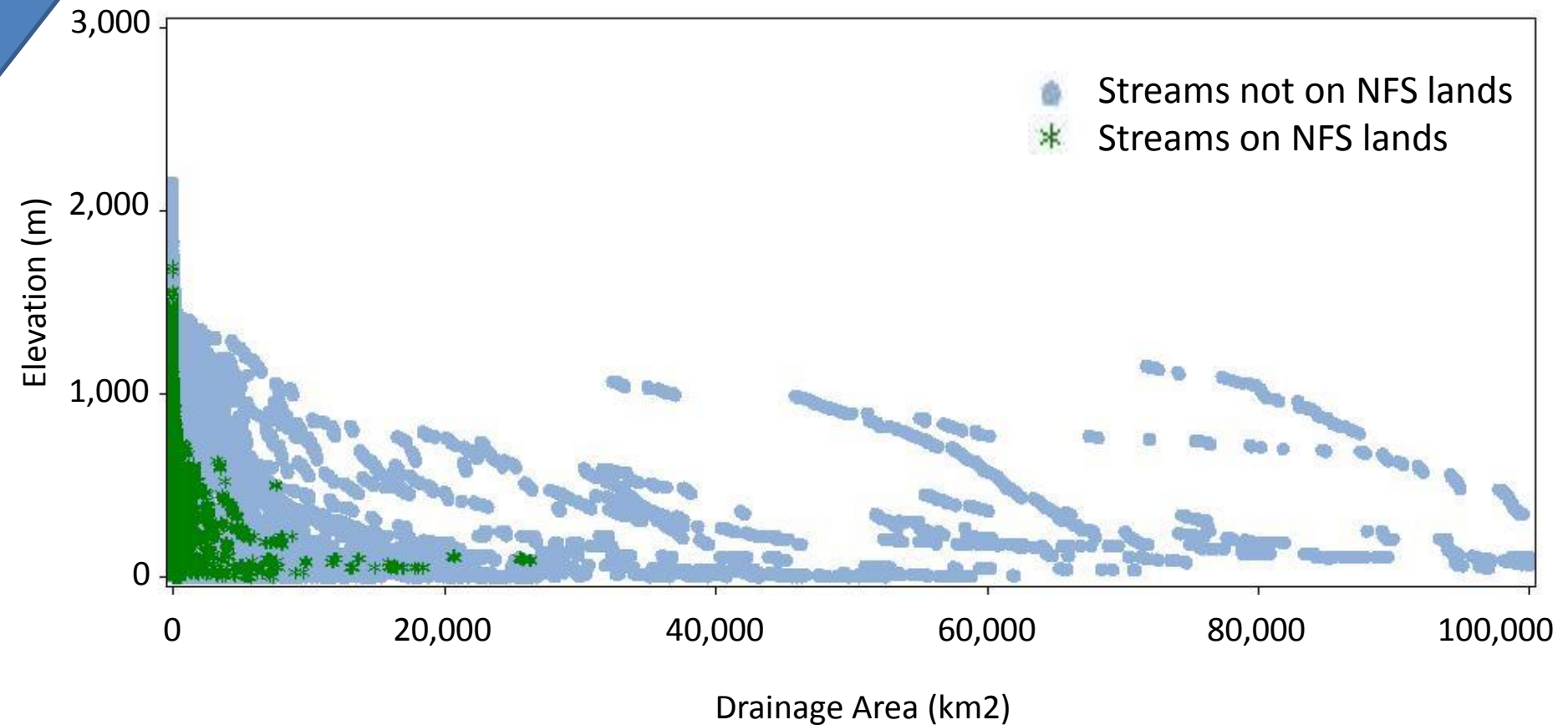
On the following 3 slides, each stream segment within Region 8 is plotted by elevation and drainage area.

Overlaid on the region's stream segments are the stream segments located on NFS lands.

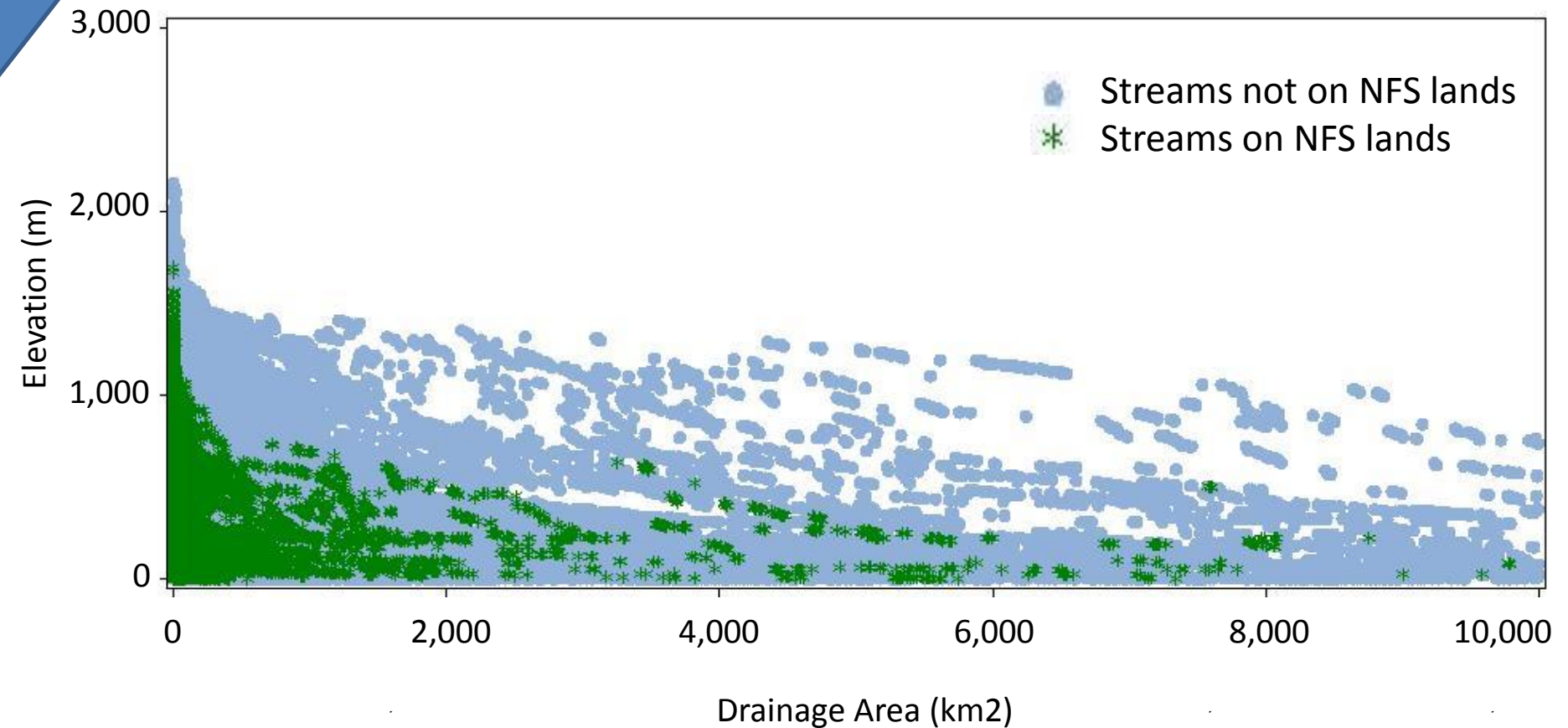
The first slide is truncated at 100,000 km² because the Mississippi River drains 3,000,000 km² and created a dramatically skewed plot.

The only difference between the slides is that for each successive slide the horizontal axis will be magnified.

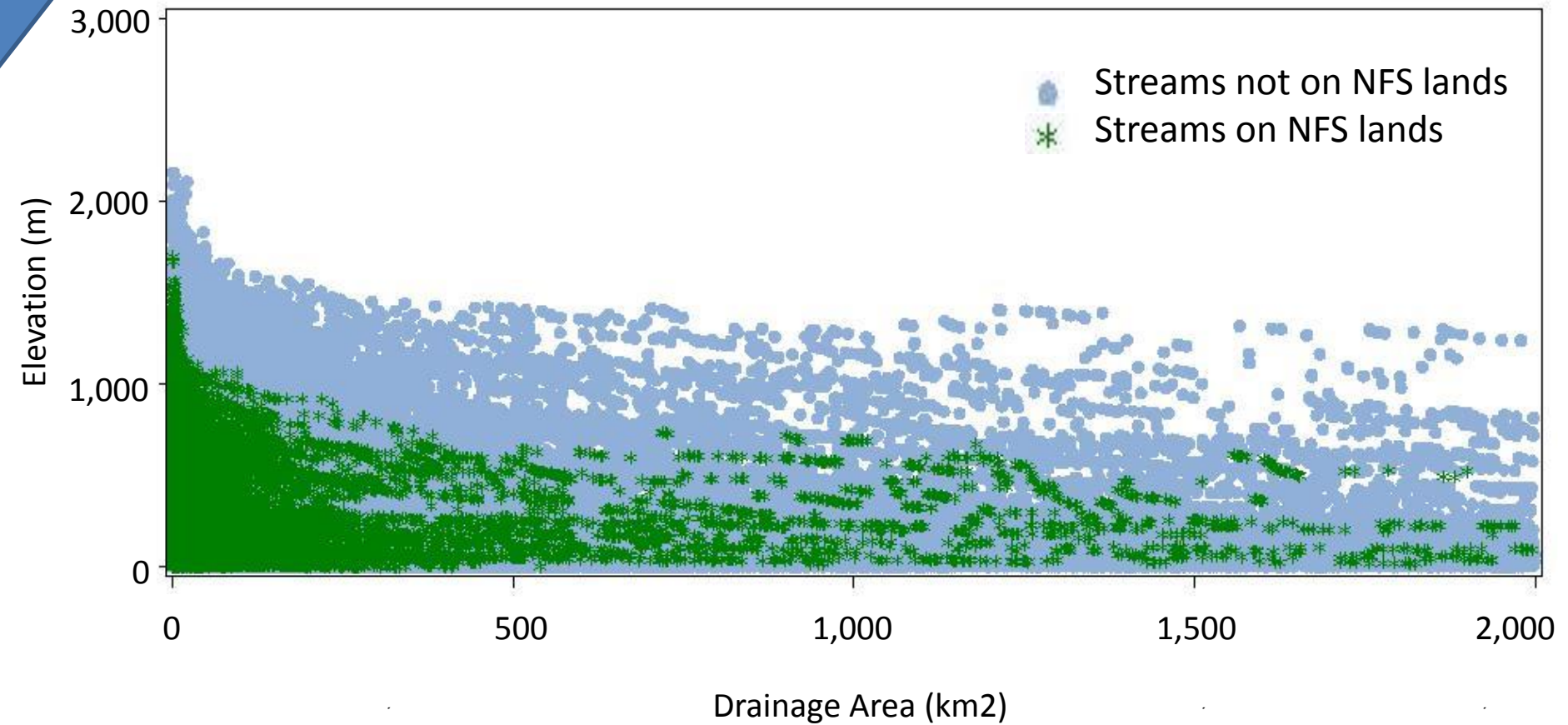
Stream Segments in Region 8



Stream Segments in Region 8



Stream Segments in Region 8



Group 2

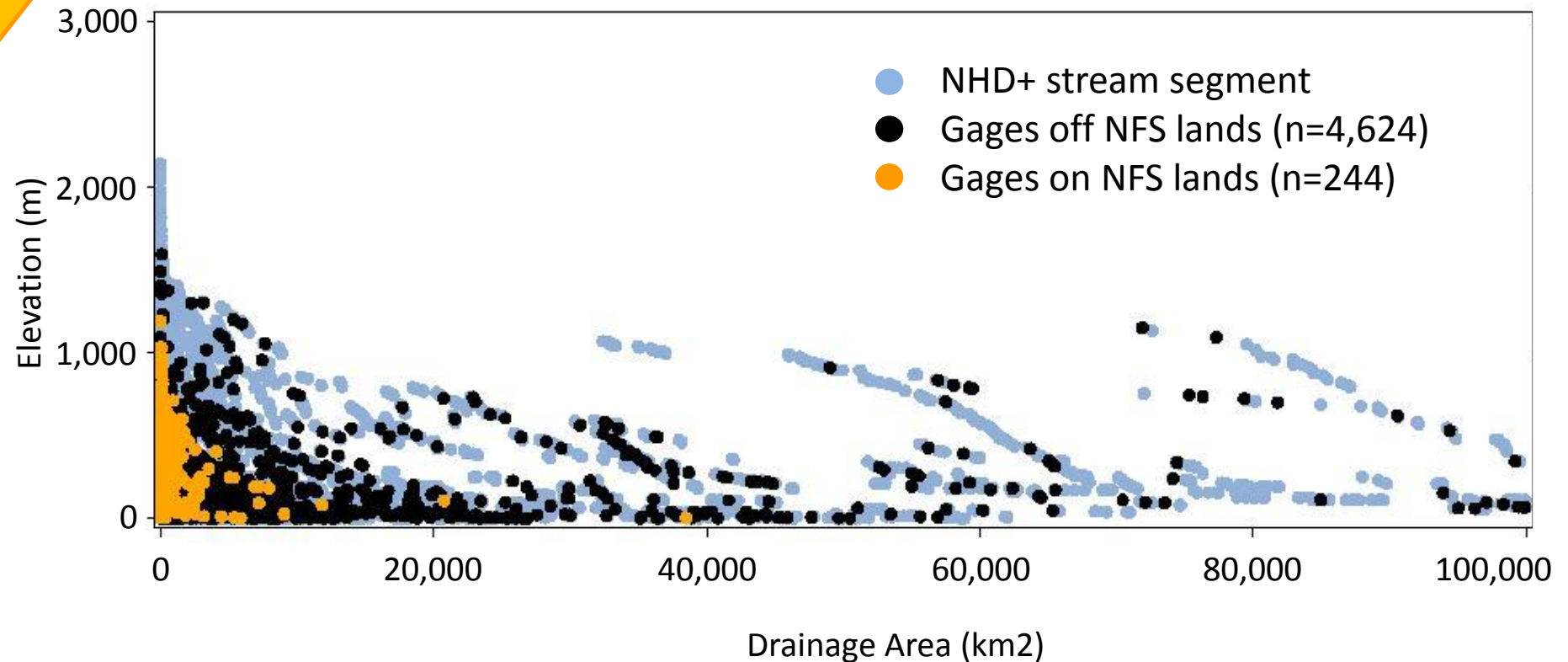
All Stream Gages - off and on NFS Lands

On the following 4 slides, each stream segment within Region 8 is plotted by elevation and drainage area (truncated at 100,000 km²).

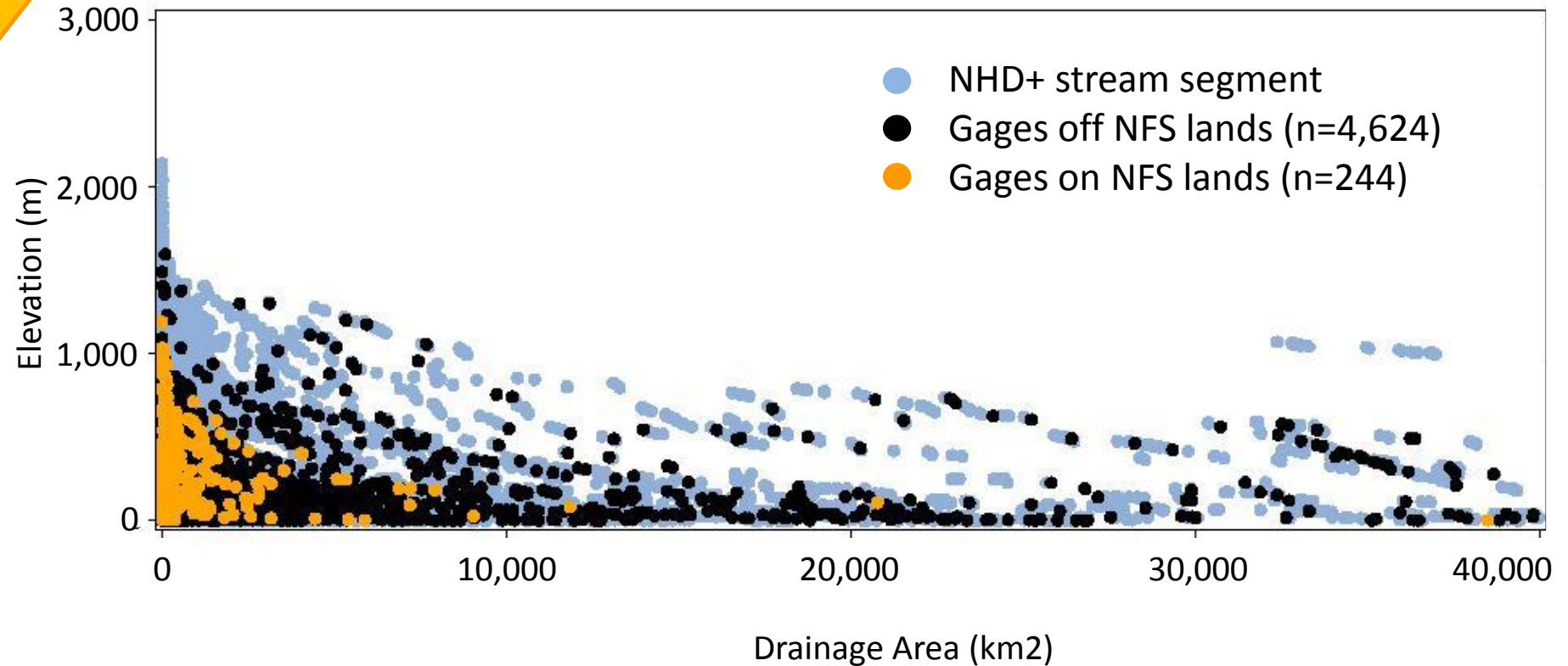
Overlaid on the stream segments are the 4,868 stream gages that are/were active since 1912. There are 4,624 gages that are not on NFS lands and 244 gages on NFS lands.

The only difference between the slides is that for each successive slide the horizontal axis will be magnified, as in Group 1.

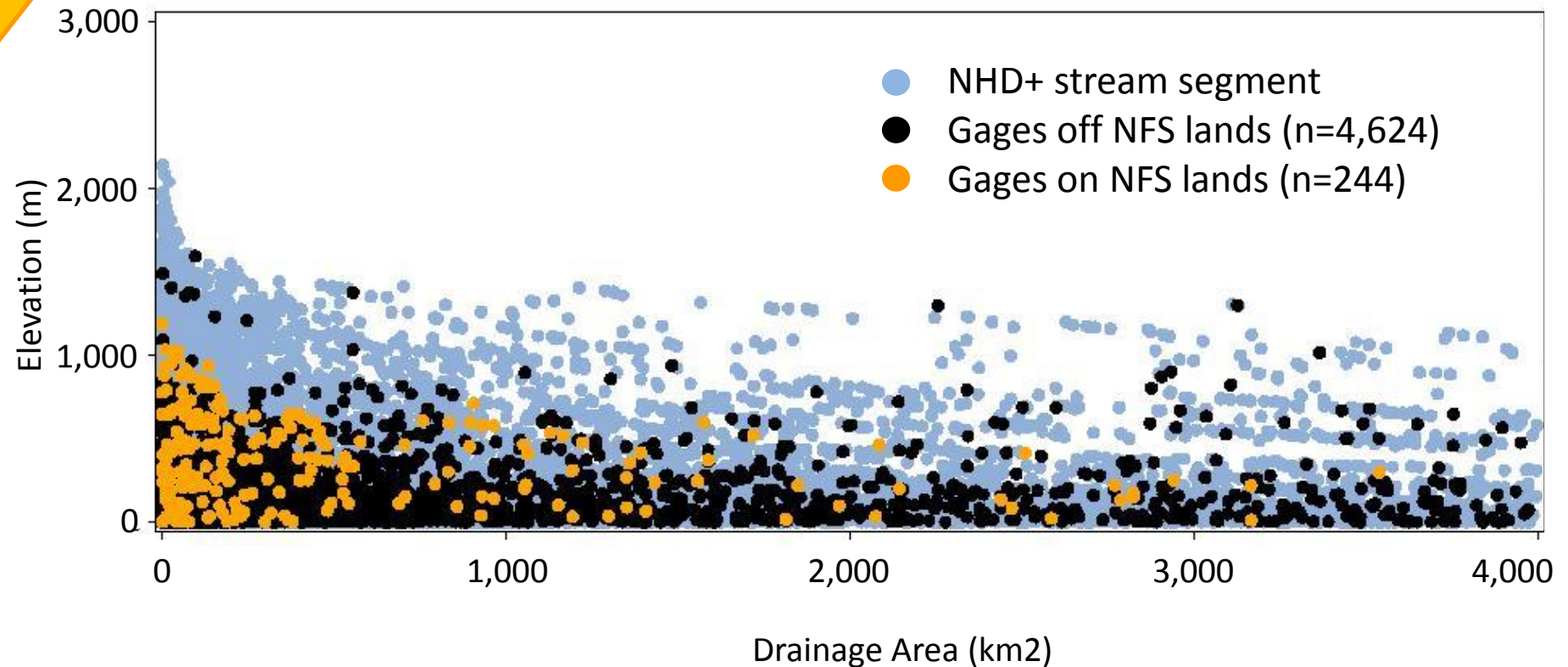
All Stream Gages - off and on NFS Lands



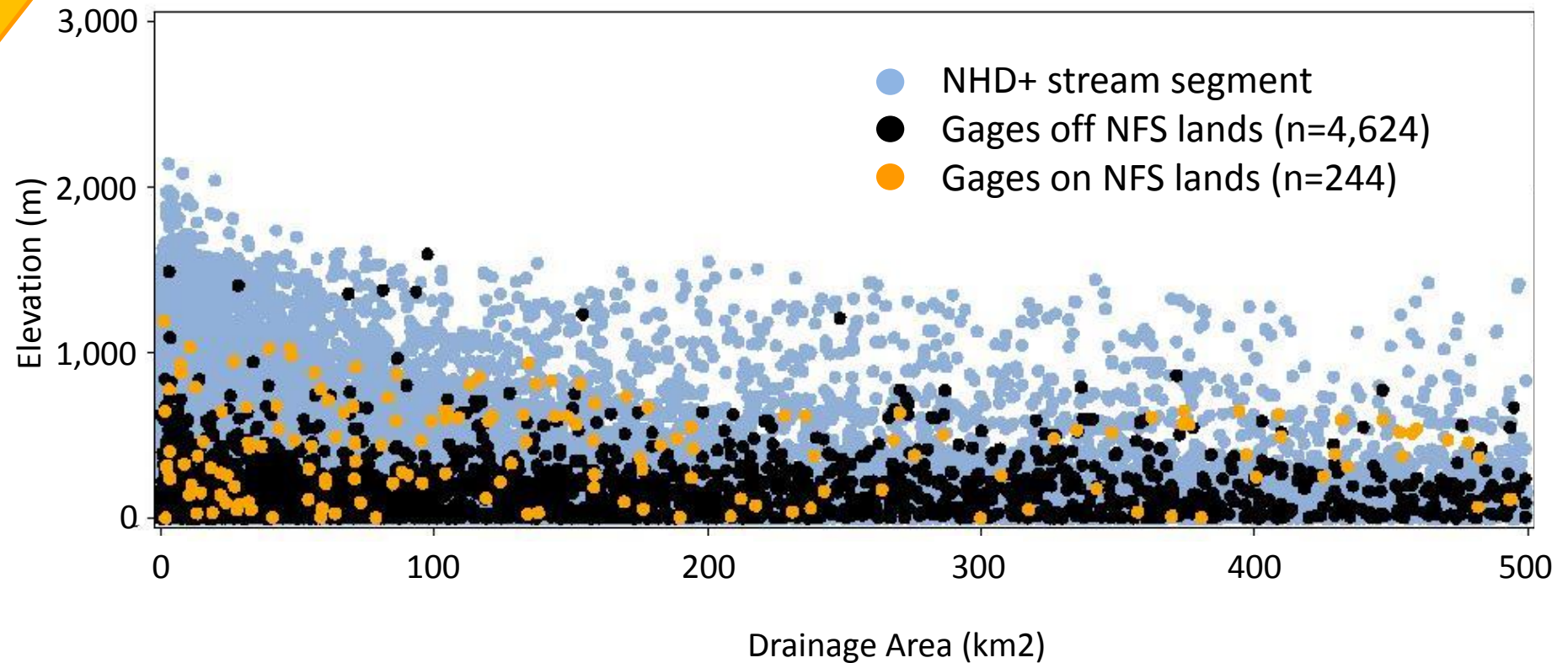
All Stream Gages - off and on NFS Lands



All Stream Gages - off and on NFS Lands



All Stream Gages - off and on NFS Lands



Group 3

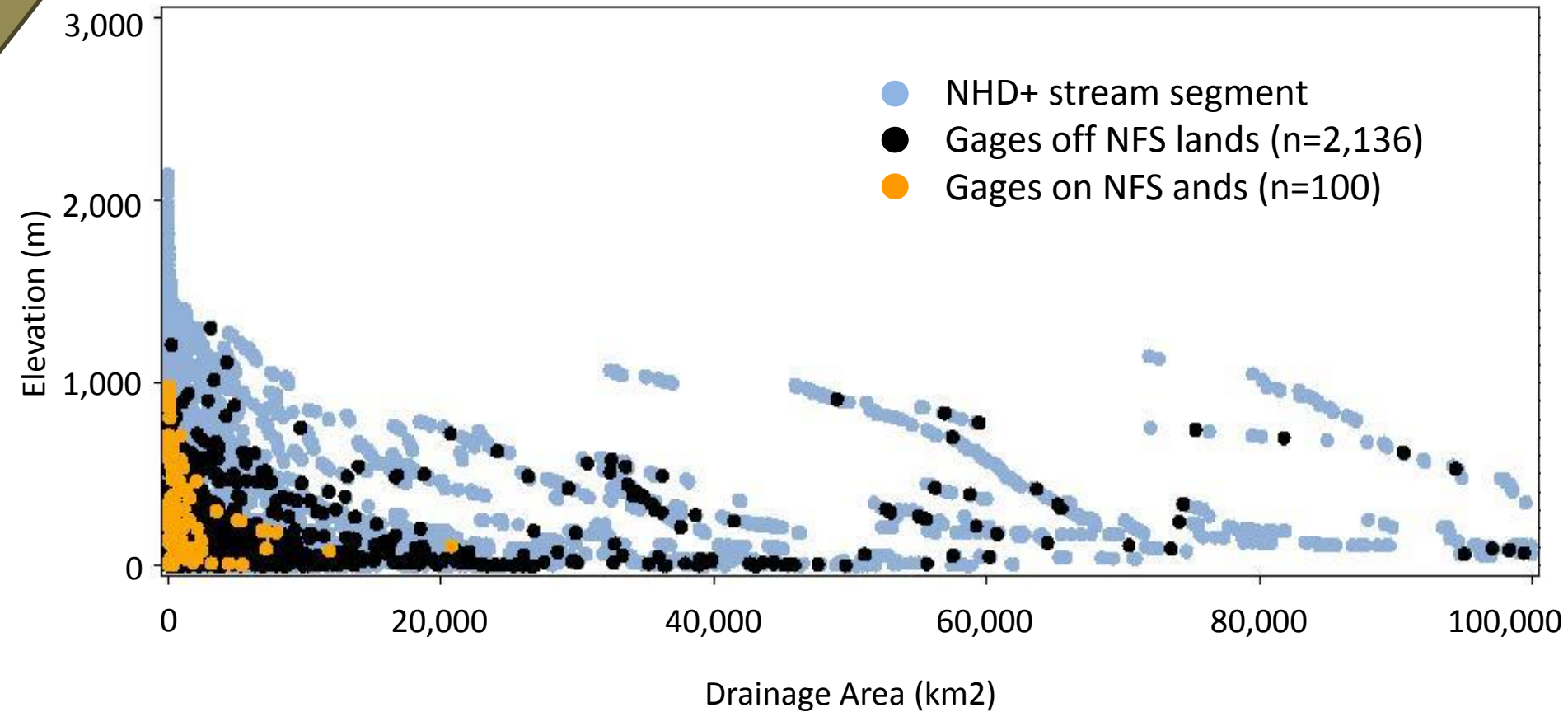
Current Stream Gages - off and on NFS Land

On the following 3 slides, each stream segment within Region 8 is plotted by elevation and drainage area (truncated at 100,000 km²).

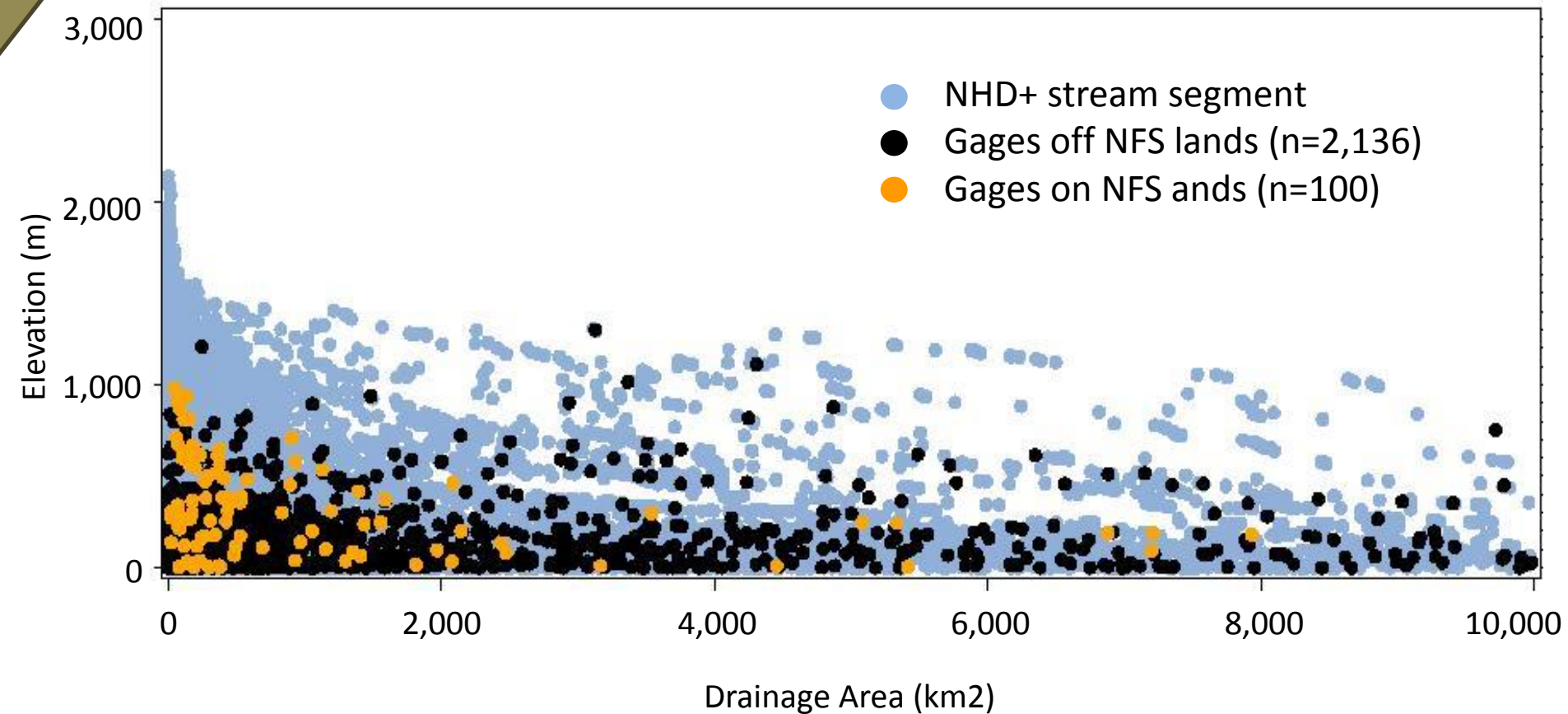
Overlaid on the stream segments are the 2,236 stream gages that are currently operational, as of January 2010. There are 2,136 operating off NFS lands and 100 gages on NFS lands.

The only difference between the slides is that for each successive slide, the horizontal axis will be magnified, as before.

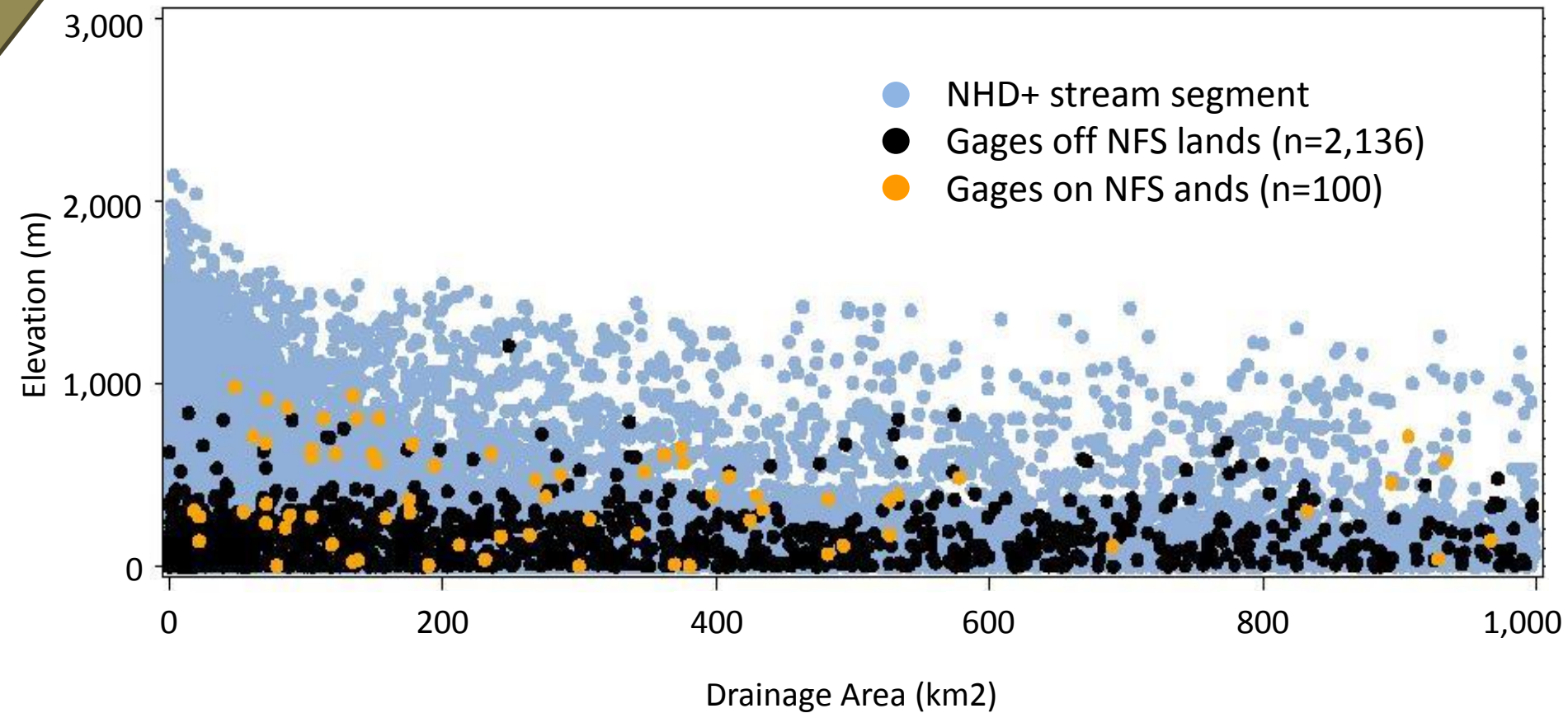
Current Stream Gages - off and on NFS Lands



Current Stream Gages - off and on NFS Lands



Current Stream Gages - off and on NFS Lands



Group 4

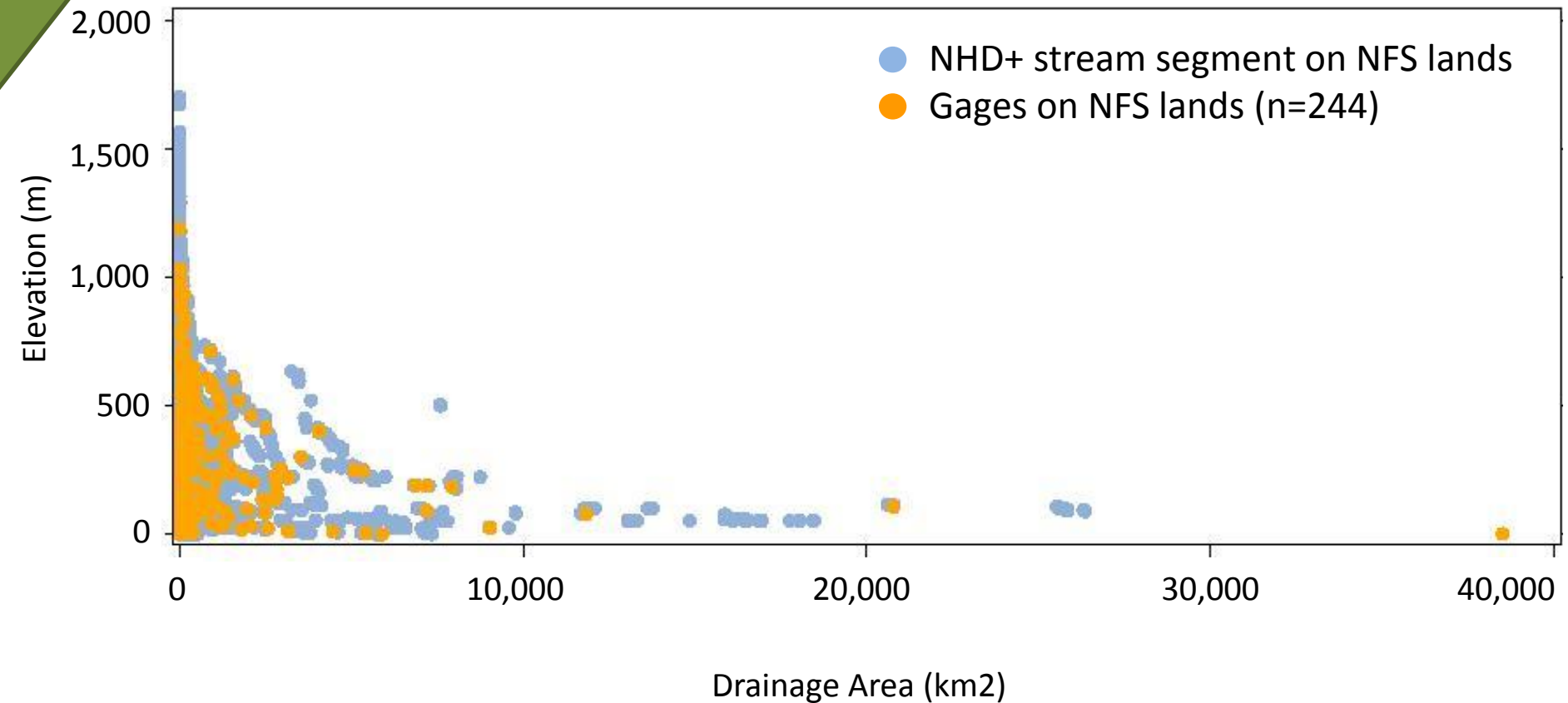
Streams and Historic Gages on NFS Lands

On the following 3 slides, we have plotted only the stream segments that are on NFS lands. Overlaid on the stream segments are the 244 stream gages that are/were active since 1912.

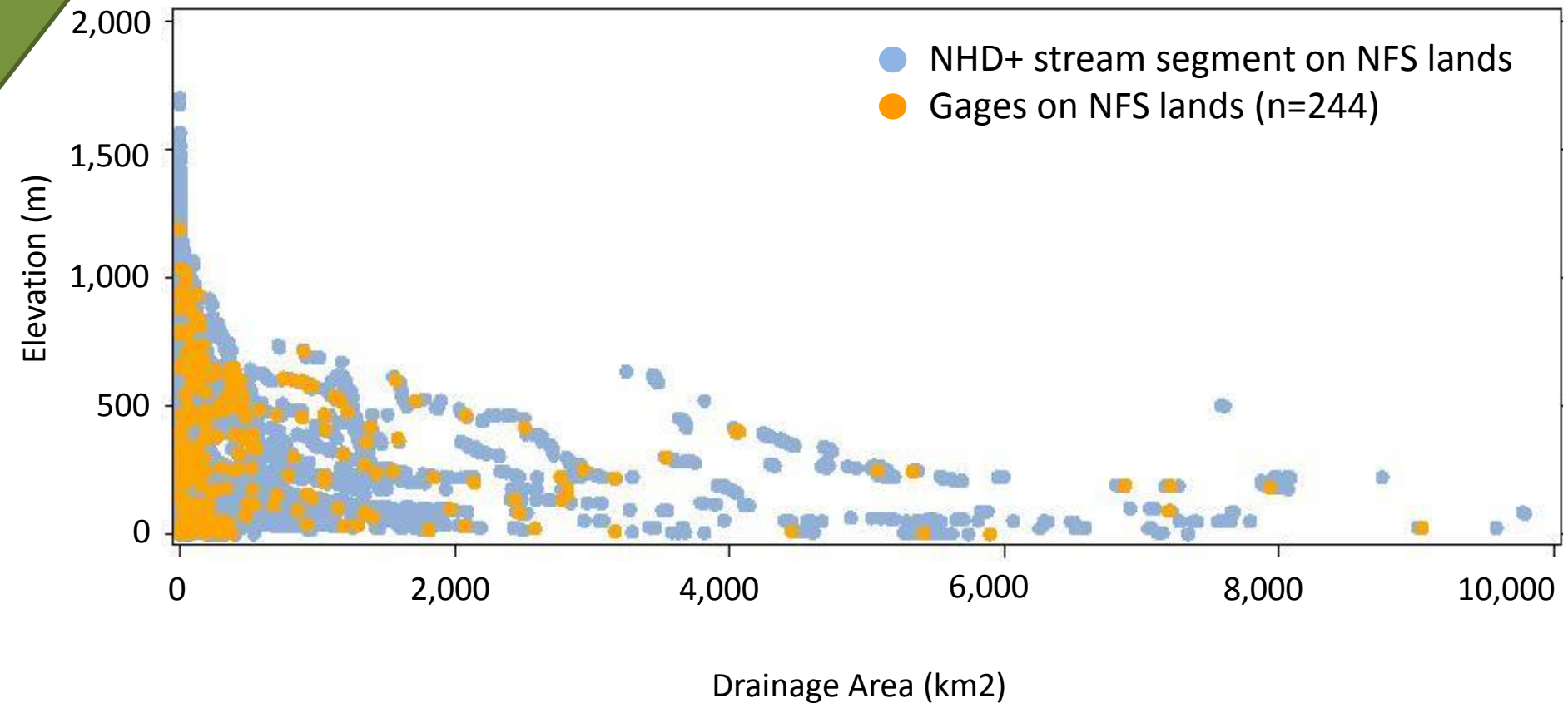
These slides allow us to see the available population of stream segments, relative to the distribution of gages that occur on the Forest, versus Group 2, which showed all stream segments in the entire region.

The only difference between the slides is that for each successive slide the horizontal axis will be magnified.

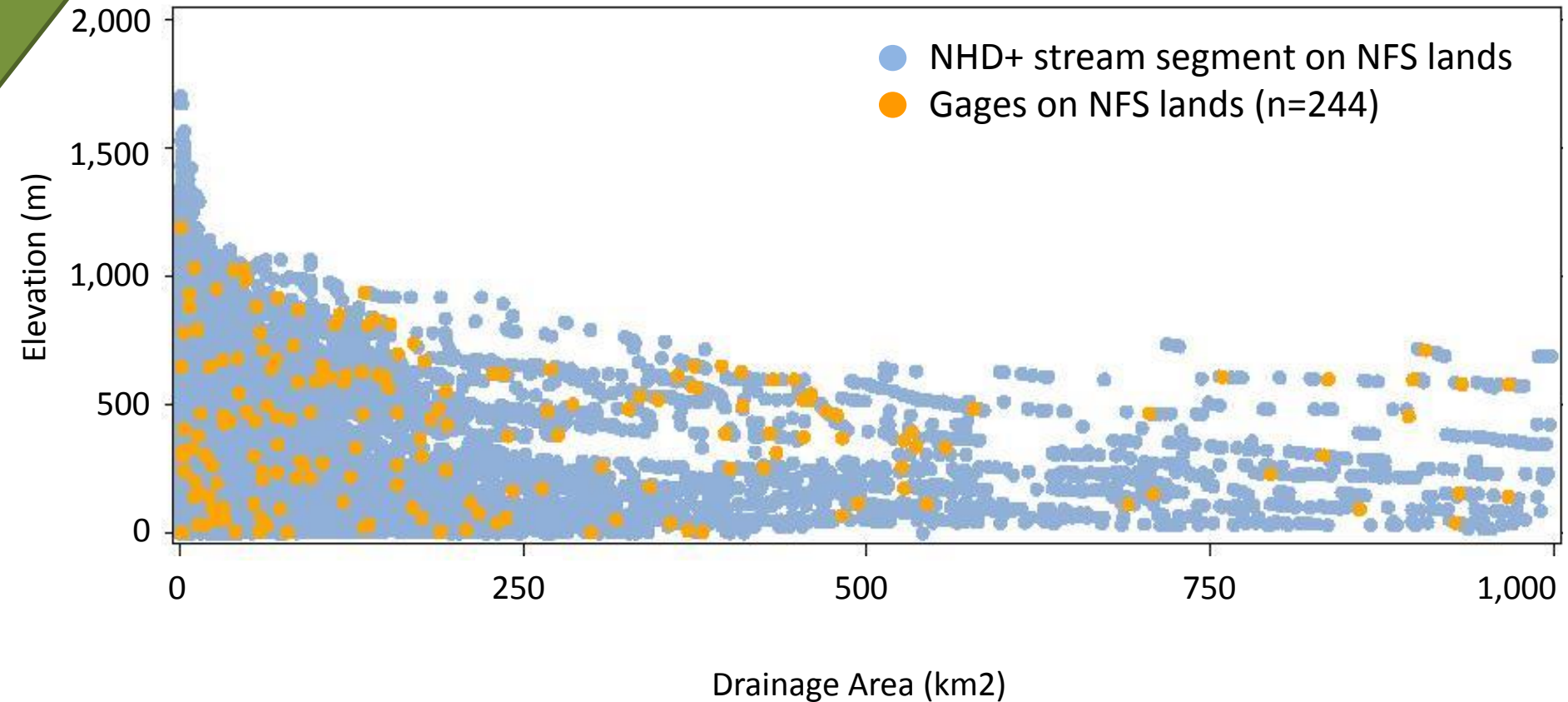
Streams and Historic Gages on NFS Lands



Streams and Historic Gages on NFS Lands



Streams and Historic Gages on NFS Lands



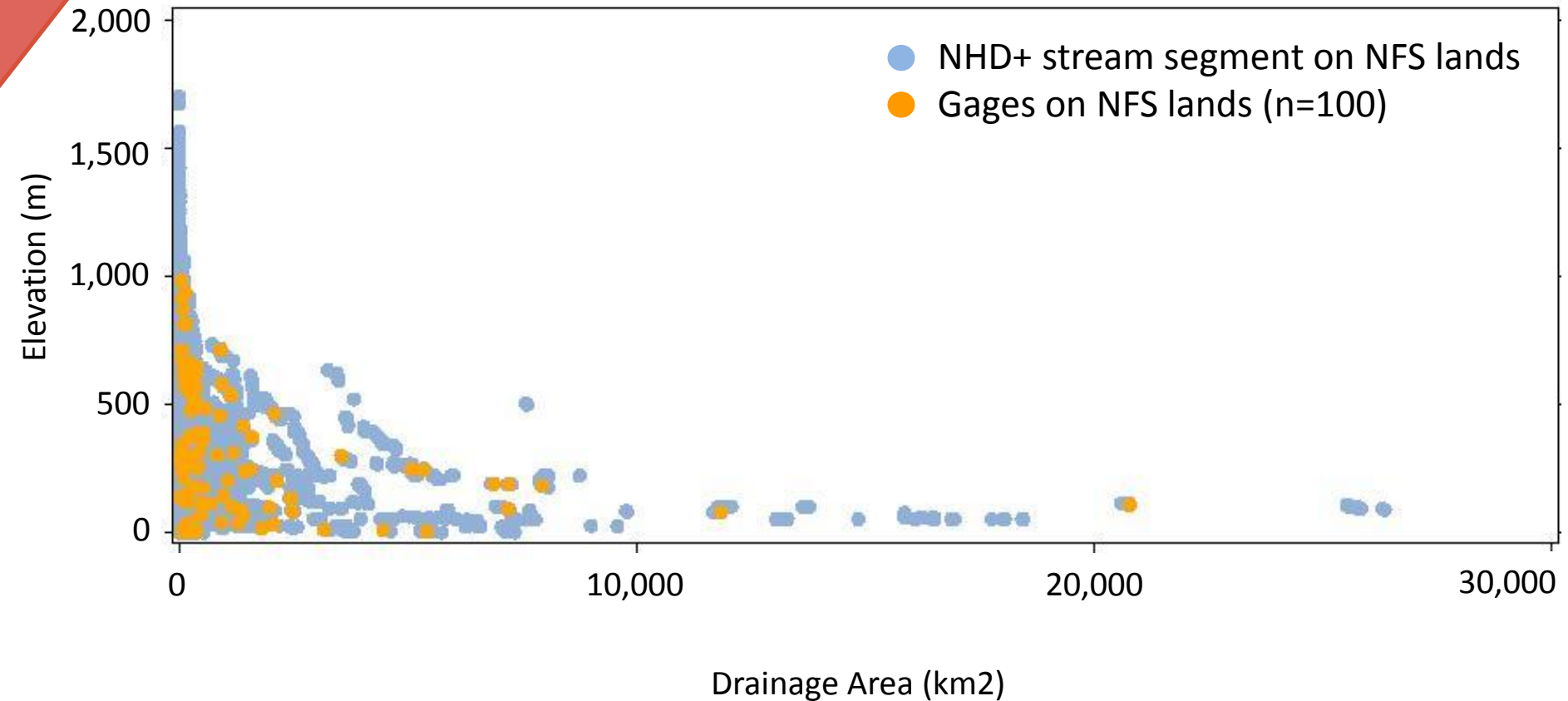
Group 5

Streams and Current Gages on NFS Lands

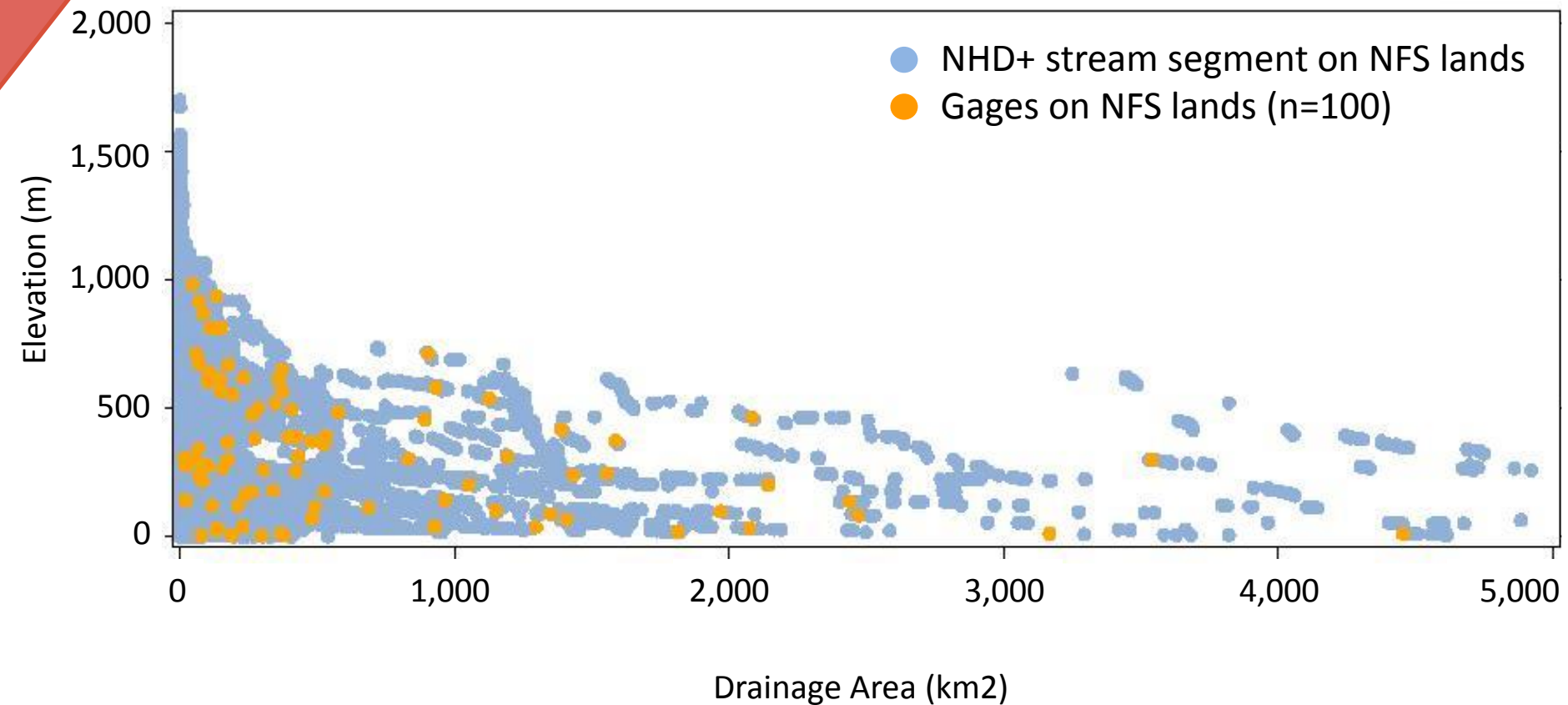
On the following 3 slides, we have plotted only stream segments that are on NFS lands. Overlaid on the stream segments are the 100 stream gages that are currently active as of January 2010.

For each successive slide the horizontal axis will be magnified.

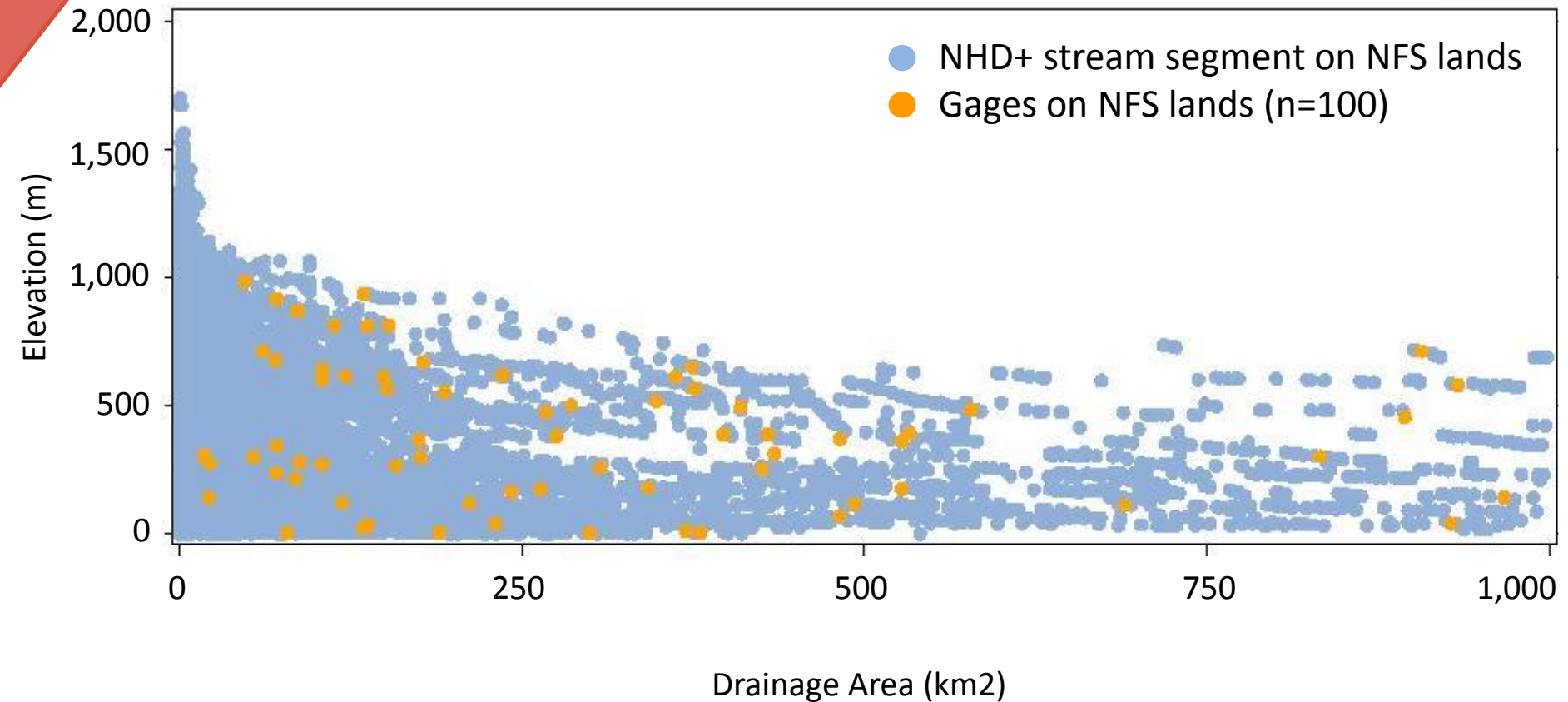
Streams and Current Gages on NFS Lands



Streams and Current Gages on NFS Lands



Streams and Current Gages on NFS Lands



Stream Gages Adjacent to NFS Lands

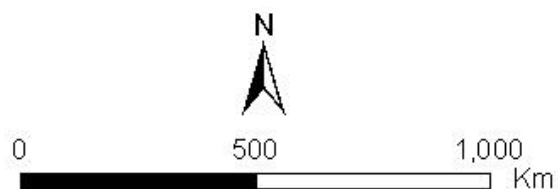
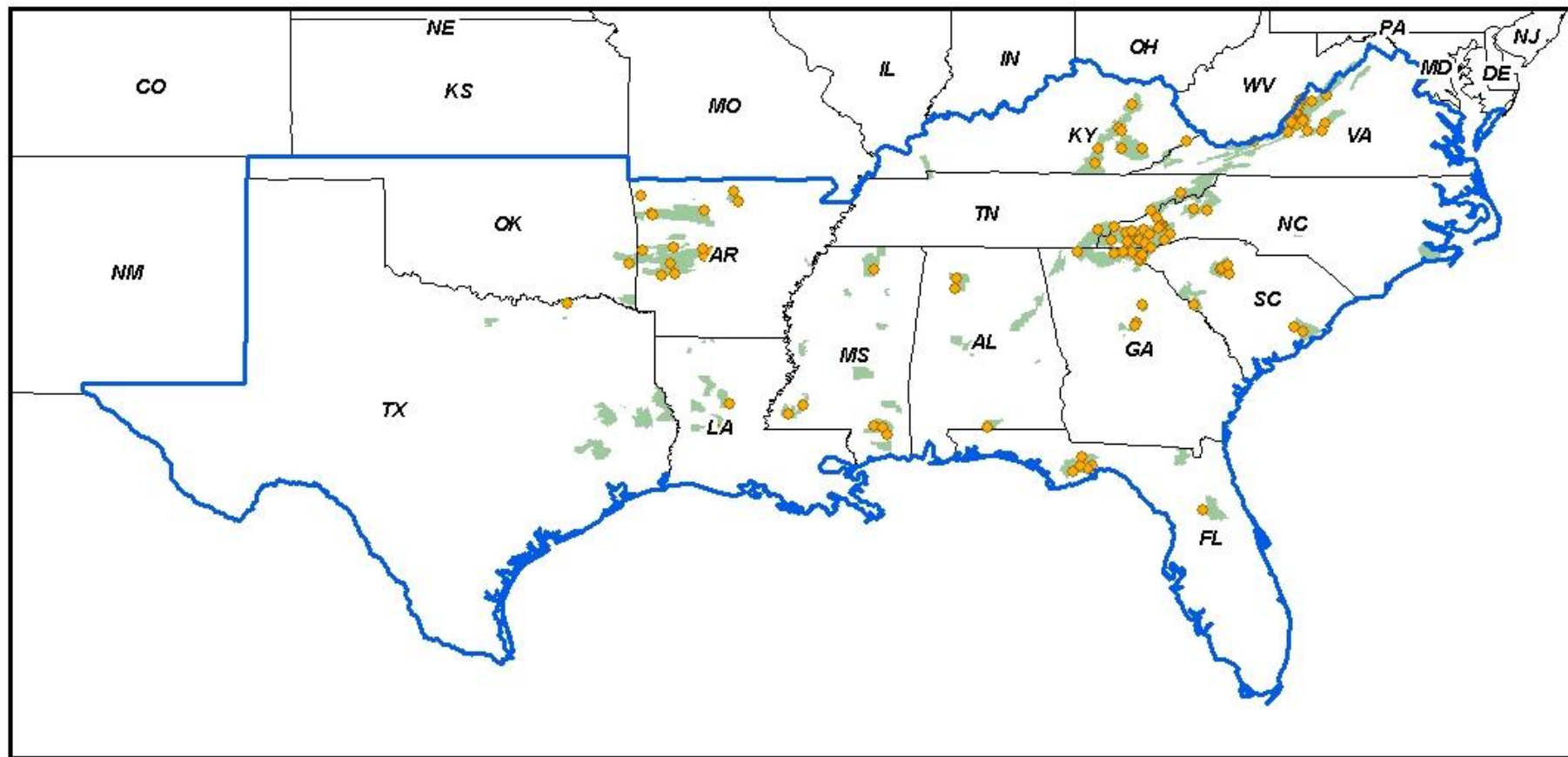
ISSUE

Many stream gages are located on waterways that are downstream of, and not on, a National Forest. In our analysis, only streams gages that touched a Forest boundary, using ArcGIS, were classified as a gage on NFS lands. This type of classification does not account for the tremendous amount of flow that influences gages immediately downstream of a Forest.

SOLUTION

On the next 6 slides we show the effect of adding a 1 Km and 10 Km buffer around the Forest boundary. We classified all gages within the buffer as being on NFS lands.

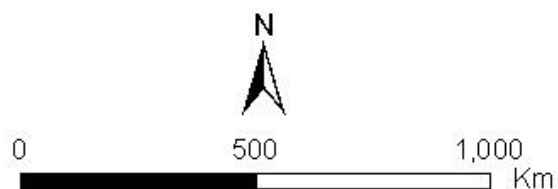
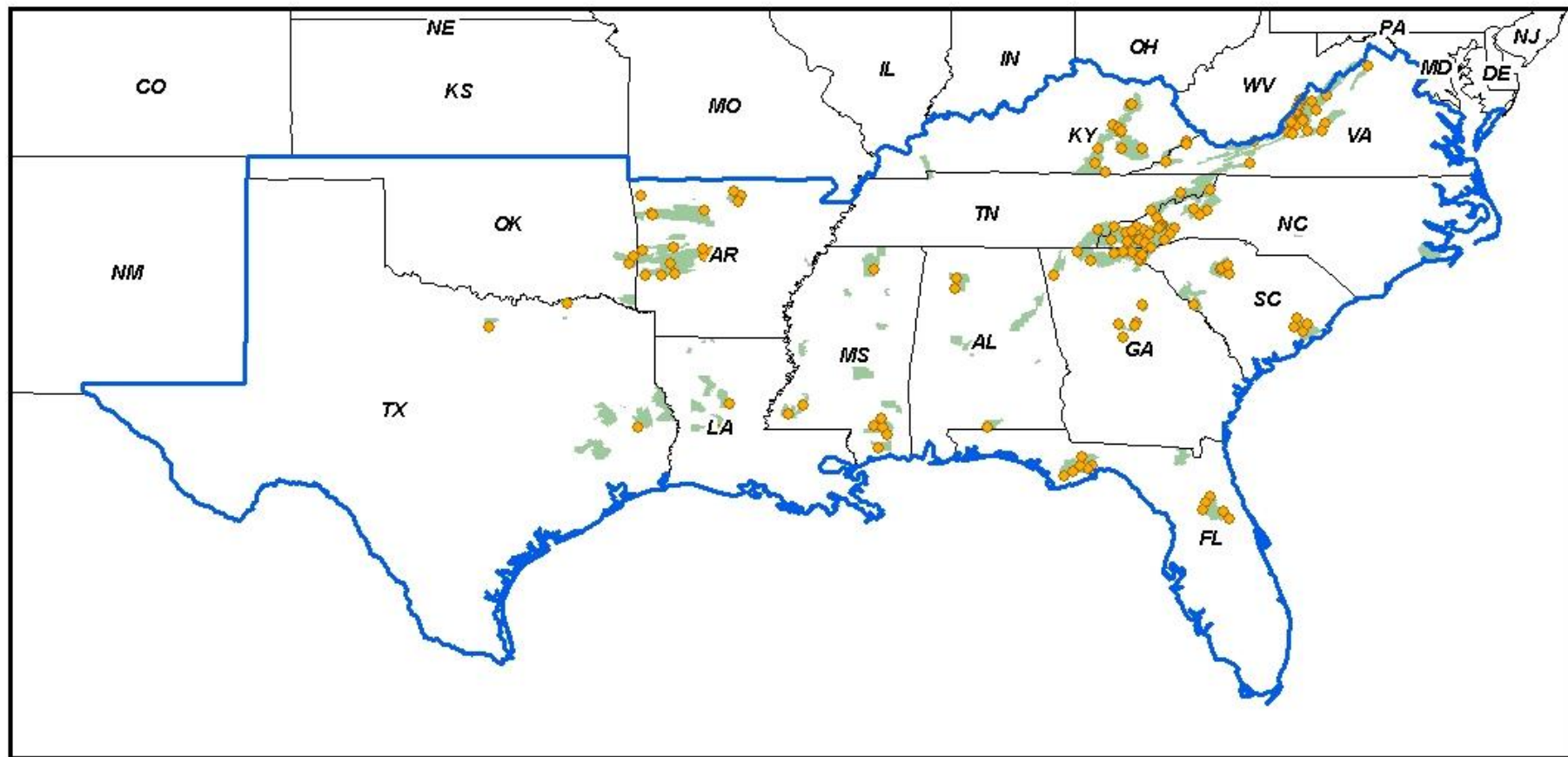
USGS Stream Gages Currently Operational: On NFS Land - **No Buffer**



Legend

- No buffer (n=100)
- NFS lands

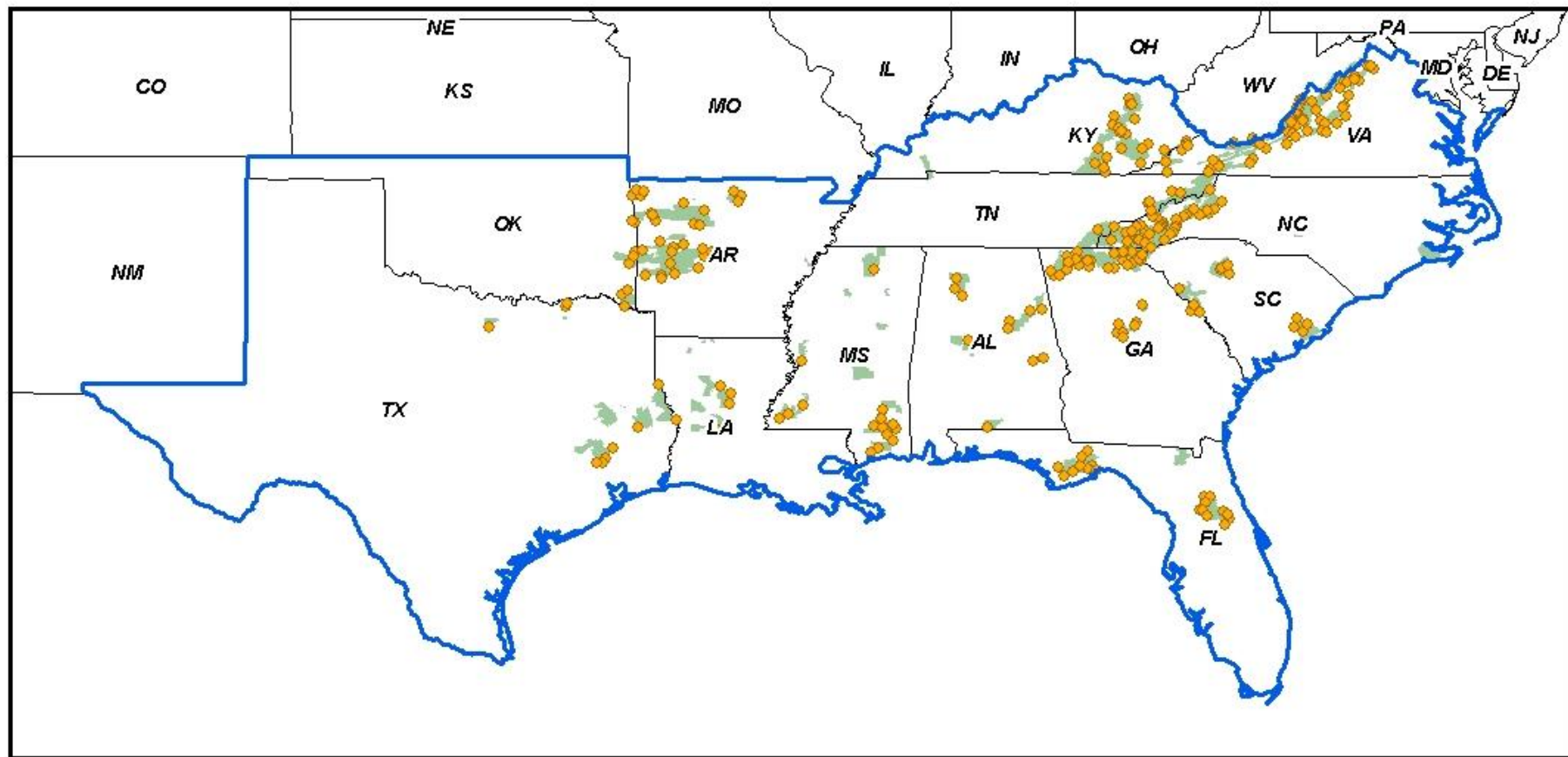
USGS Stream Gages Currently Operational: On NFS Lands - **Within 1 Km**



Legend

- Within 1 Km of NFS (n=133)
- NFS lands

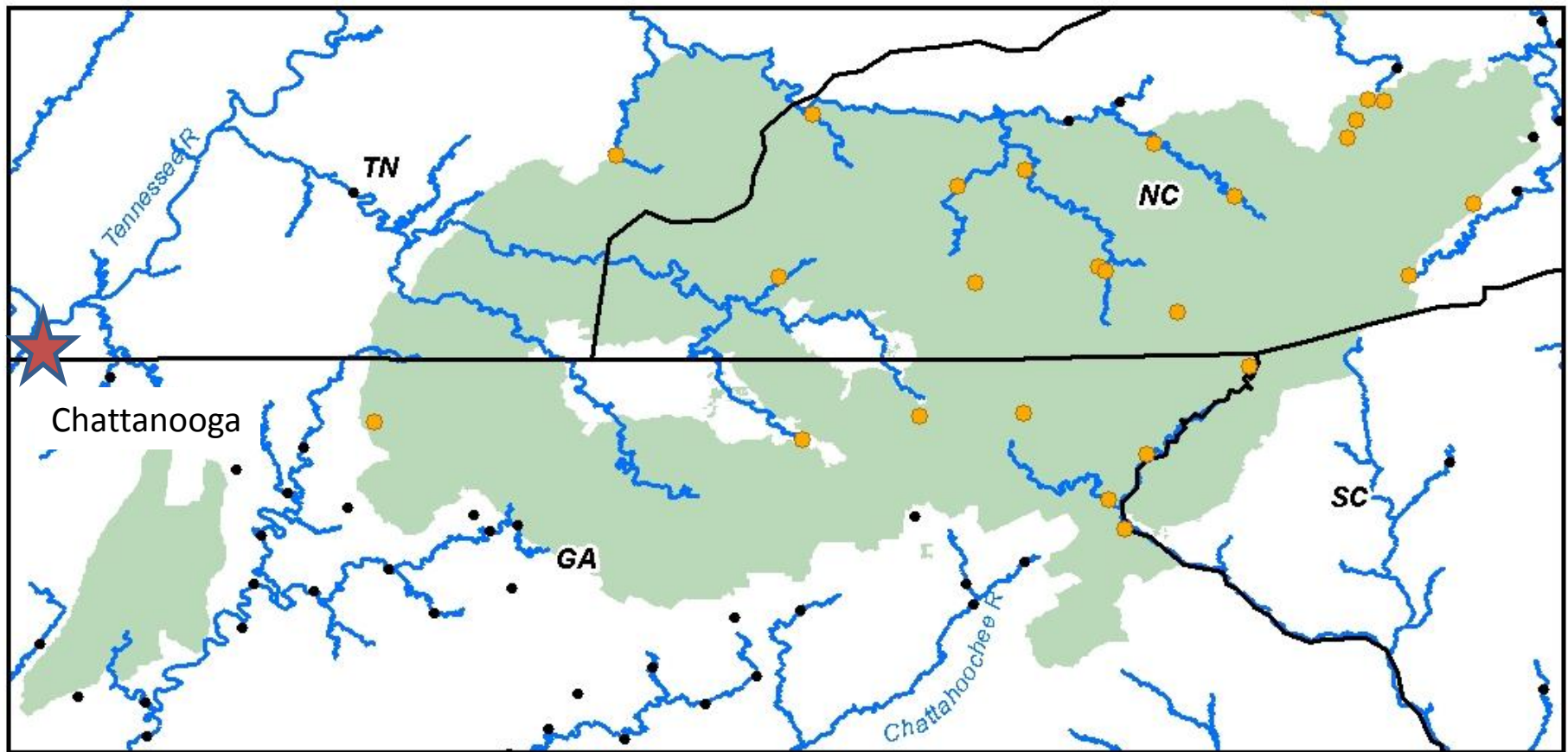
USGS Stream Gages Currently Operational: On NFS Lands - **Within 10 Km**



Legend

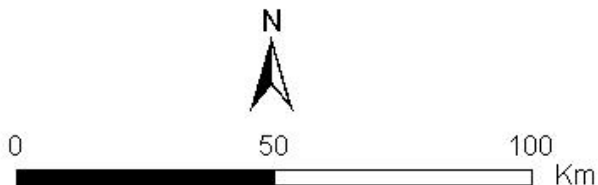
- Within 100 Km of NFS (n=262)
- NFS lands

USGS Stream Gages Currently Operational: On NFS Lands - **No Buffer**

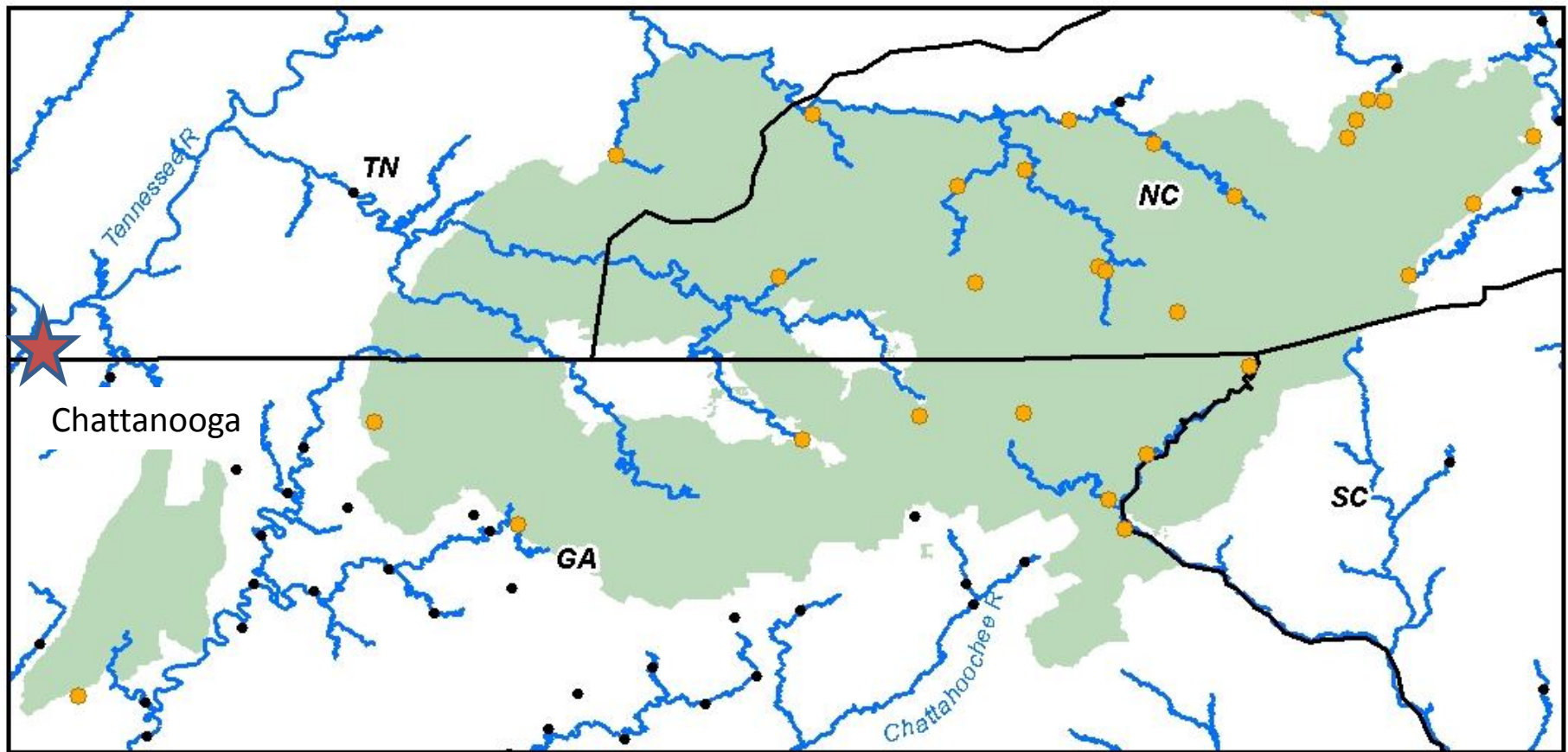


Legend

- No buffer
- Not on NFS lands
- NFS lands



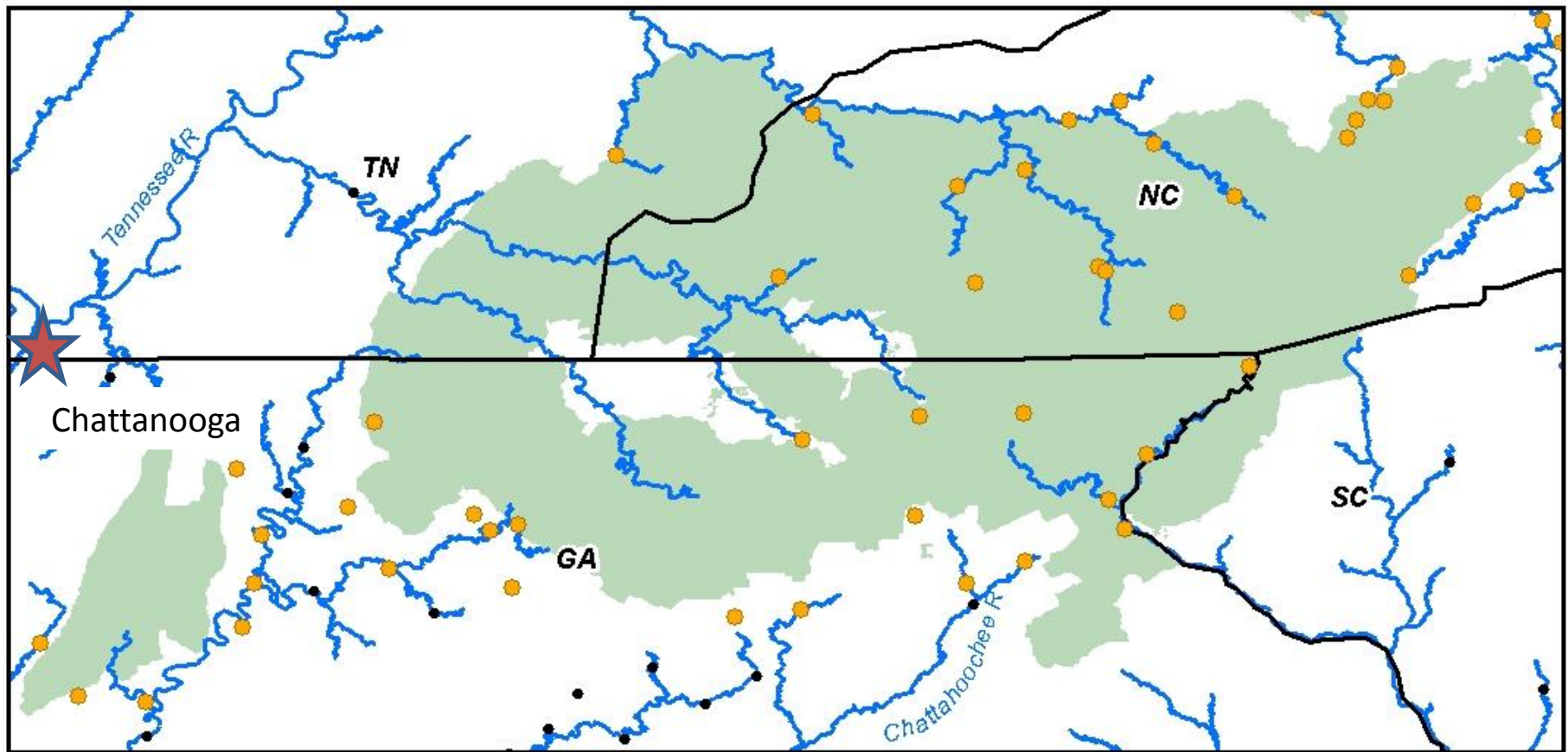
USGS Stream Gages Currently Operational: On NFS Lands - **Within 1 Km**



Legend

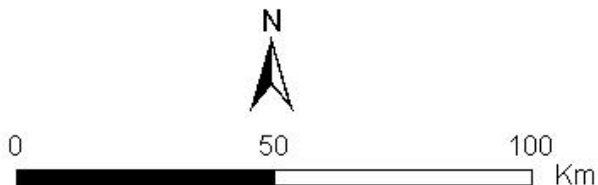
- Within 1 Km of NFS
- Not on NFS lands
- NFS lands

USGS Stream Gages Currently Operational: On NFS Lands - **Within 10 Km**

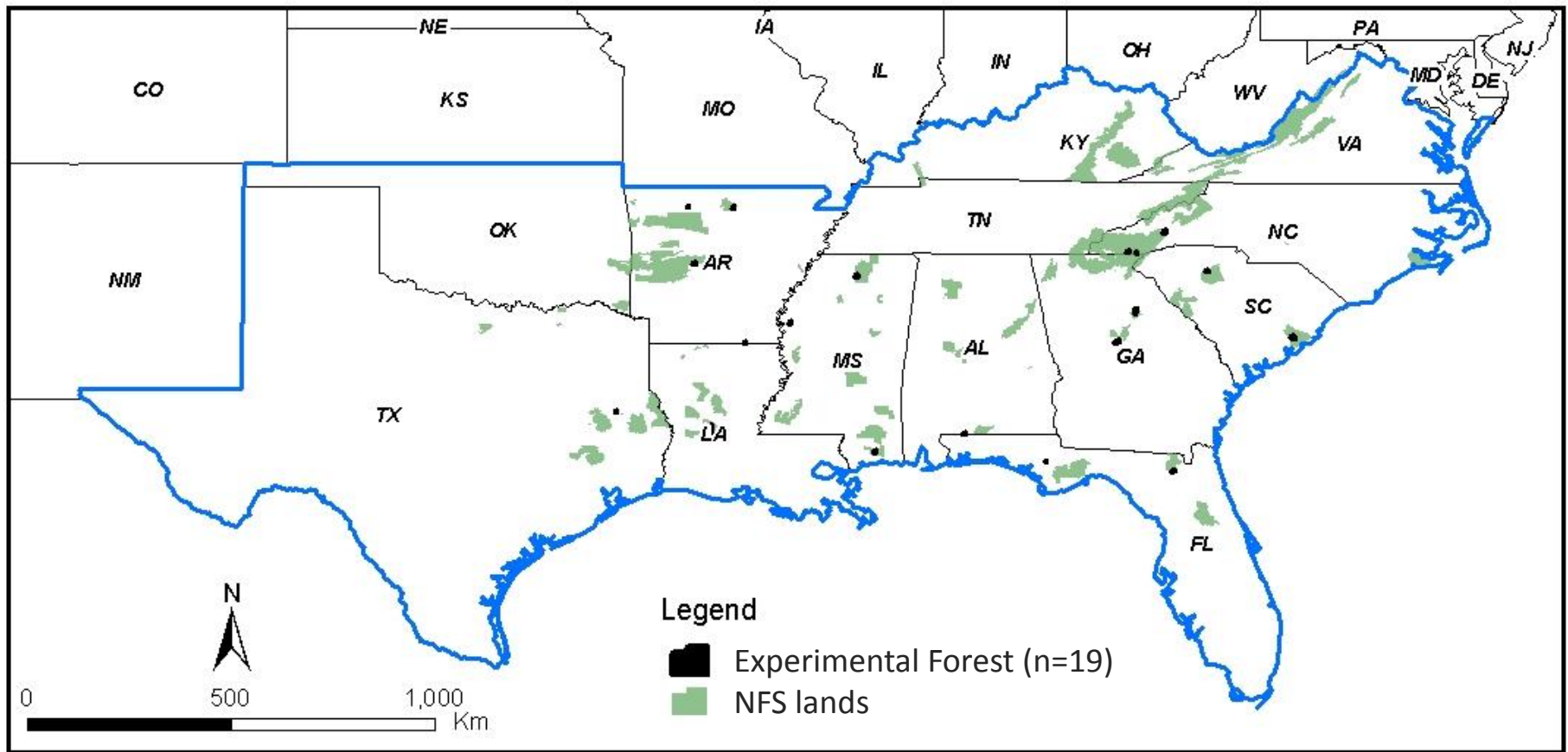


Legend

- Within 10 Km of NFS
- Not on NFS lands
- NFS lands



Experimental Forests in Region 8



The End

